



A Report On Some Rare,  
Threatened, Or Endangered  
Forest-Related Vascular Plants Of  
The South

By  
James W. Spongberg and Robert C. Anderson

U.S. Department of Agriculture  
Forest Service

Washington, D.C. 20250

1984

Forest Service Research Report

RP-344

U.S. Government Printing Office

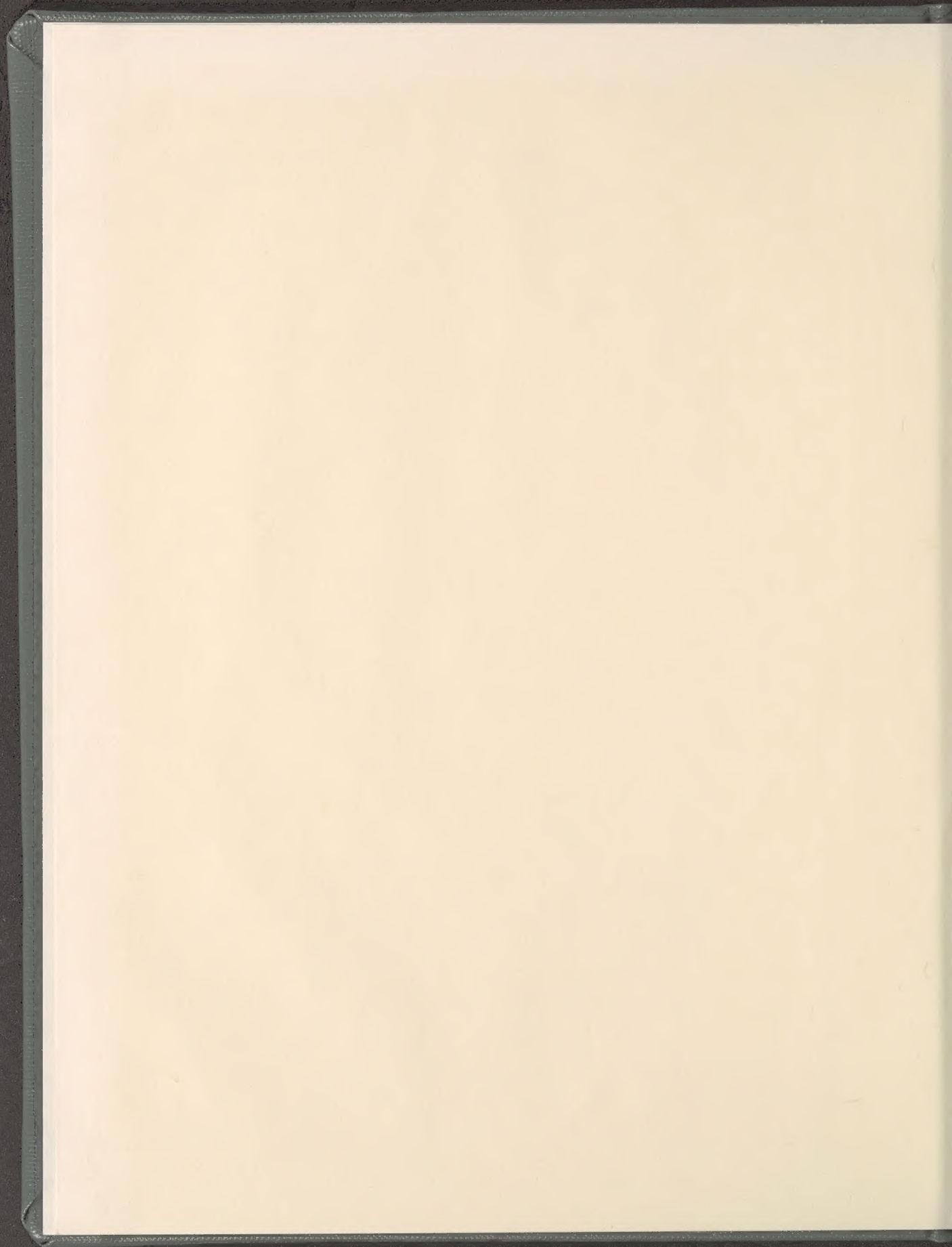
Washington, D.C. 20540

Stock Number 344-100

For sale by the Superintendent of Documents

U.S. Government Printing Office

Washington, D.C. 20540





3D11  
5962

United States  
Department of  
Agriculture

Forest Service  
Southern Region



py 2

# A Report On Some Rare, Threatened, Or Endangered Forest-Related Vascular Plants Of The South

Volume II  
Aquifoliaceae through Asteraceae and Glossary



FOREST SERVICE  
CURRENT SERIAL RECORDS

NOV 21 '83

U.S. DEPT. OF AGRICULTURE  
NATIONAL ARCHIVES  
WASHINGTON, D.C.

A Report on the  
Progress of the  
Work of the  
The  
The  
The  
The



A REPORT ON SOME RARE, THREATENED, OR ENDANGERED  
FOREST-RELATED VASCULAR PLANTS OF THE SOUTH

Volume II  
Aquifoliaceae through Asteraceae  
and Glossary

by

Robert Kral  
Professor of Botany  
Director of Herbarium  
Vanderbilt University  
Nashville, Tennessee  
37235

Published by the USDA Forest Service  
as part of a Cooperative Agreement  
between the Service and Vanderbilt University

USDA Forest Service  
Southern Region  
1720 Peachtree Road, N. W.  
Atlanta, Georgia 30367

Technical Publication R8-TP 2  
March 1983

A REVIEW OF THE WORK, PRESENTED BY THE  
COMMISSIONERS OF THE LAND OFFICE

VOLUME II  
PART II  
AND APPENDIX

BY

ROBERT KIRK  
PROFESSOR OF HISTORY  
UNIVERSITY OF MICHIGAN  
ANN ARBOR, MICHIGAN  
1913

Published by the University of Michigan  
Library of the University of Michigan  
Between the University and the University of Michigan

THE UNIVERSITY OF MICHIGAN  
LIBRARY  
ANN ARBOR, MICHIGAN  
1913

UNIVERSITY OF MICHIGAN  
ANN ARBOR, MICHIGAN  
1913



---

Readers should refer to Volume I for:

Preface

Scope, Design and Limitations of the Work

Acknowledgments

Isoetaceae through Euphorbiaceae

---

## CONTENTS

### VOLUME II

	<u>Page</u>
AQUIFOLIACEAE	
<u>Ilex amelanchier</u> M. A. Curtis.....	719
<u>I. opaca</u> L. var. <u>aernicola</u> (Ashe) Ashe.....	723
CELASTRACEAE	
<u>Paxistima canbyi</u> Gray.....	727
RHAMNACEAE	
<u>Sageretia minutiflora</u> (Michx.) Trel.....	731
MALVACEAE	
<u>Callirhoe papaver</u> (Cav.) Gray var. <u>bushii</u> (Fernald) Waterfall.....	736
<u>Iliamna remota</u> Greene.....	741
HYPERICACEAE	
<u>Hypericum cumulicola</u> (Small) P. Adams.....	745
<u>H. edisonianum</u> (Small) Adams & Robeson.....	749
<u>H. lissochloaeus</u> P. Adams.....	753
CISTACEAE	
<u>Hudsonia ericoides</u> L. ssp. <u>montana</u> (Nutt.) Nickerson & Skog.....	758
<u>Lechea cernua</u> Small.....	762
<u>L. divaricata</u> Shuttlw.....	766
<u>L. maritima</u> Legg. var. <u>virginica</u> Hodgdon .....	770
VIOLACEAE	
<u>Viola egglesonii</u> Brainerd.....	774

LYTHRACEAE	
<u>Cuphea aspera</u> Chapman.....	779
<u>Lythrum curtissii</u> Fernald.....	783
<u>L. flagellare</u> Shuttlw.....	787
MELASTOMATACEAE	
<u>Rhexia parviflora</u> Chapman.....	791
<u>R. salicifolia</u> Kral & Bostick..	795
ONAGRACEAE	
<u>Oenothera pilosella</u> Raf. ssp. <u>sessilis</u> (Pennell)	
<u>G. Straley</u> .....	799
HALORAGACEAE	
<u>Myriophyllum laxum</u> Shuttlw. ex Chapman.....	804
APIACEAE	
<u>Eryngium cuneifolium</u> Small.....	807
<u>Oxypolis canbyi</u> (Coult. & Rose) Fernald.....	811
<u>O. greenmanii</u> Mathias & Constance.....	816
<u>Ptilimnium nodosum</u> (Rose) Mathias.....	820
<u>Sium floridanum</u> Small.....	825
ERICACEAE	
<u>Elliottia racemosa</u> Muhlenberg.....	829
<u>Kalmia cuneata</u> Michx.....	833
<u>Rhododendron austrinum</u> (Small) Rehder.....	837
<u>R. bakeri</u> (Lemmon & McKay) Hume.....	841
<u>R. chapmanii</u> Gray.....	846
<u>R. prunifolium</u> (Small) Millais.....	850
<u>R. vaseyi</u> Gray.....	854
DIAPENSIACEAE	
<u>Pyxidanthera brevifolia</u> Wells.....	859
<u>Shortia galacifolia</u> T. & G.....	864
PRIMULACEAE	
<u>Lysimachia asperuliaefolia</u> Poirlett.....	869
OLEACEAE	
<u>Chionanthus pygmaeus</u> Small.....	873
LOGANIACEAE	
<u>Spigelia gentianoides</u> Chapman.....	877
<u>S. loganioides</u> (T. & G. ex Engl.) A.DC.....	881
GENTIANACEAE	
<u>Gentiana pennelliana</u> Fernald.....	885
ASCLEPIADACEAE	
<u>Asclepias viridula</u> Chapman.....	889
<u>Matelea alabamensis</u> (Vail) Woodson.....	892
<u>M. floridana</u> (Vail) Woodson.....	898
CONVOLVULACEAE	
<u>Bonamia grandiflora</u> (A.Gray) Heller.....	903
<u>Cuscuta harperi</u> Small.....	907
POLEMONIACEAE	
<u>Phlox bifida</u> Beck ssp. <u>stellaria</u> (Gray) Wherry.....	911
<u>P. pulchra</u> Wherry.....	916
HYDROPHYLLACEAE	
<u>Phacelia dubia</u> (L.) Trel. var. <u>georgiana</u> McVaugh....	920
BORAGINACEAE	
<u>Onosmodium molle</u> Michx.....	924



VERBENACEAE	
<u>Verbena maritima</u> Small.....	929
<u>V. tampensis</u> Nash.....	933
LAMIACEAE	
<u>Calamintha ashei</u> (Weatherby) Shinnery.....	937
<u>C. dentata</u> Chapman.....	941
<u>Conradina brevifolia</u> Shinnery.....	945
<u>C. glabra</u> Shinnery.....	949
<u>C. grandiflora</u> Small.....	954
<u>C. verticellata</u> Jennison.....	958
<u>Dicerandra cornutissima</u> R. Huck.....	962
<u>D. frutescens</u> Shinnery.....	966
<u>D. immaculata</u> O. Lakela.....	970
<u>D. odoratissima</u> R. Harper.....	974
<u>Hedeoma graveolens</u> Chapman.....	978
<u>Macbridea alba</u> Chapman.....	982
<u>Monarda stipitoglandulosa</u> Waterfall.....	986
<u>Physostegia leptophylla</u> Small.....	990
<u>P. veroniciformis</u> Small.....	994
<u>Pycnanthemum curvipes</u> (Greene) Grant & Epling.....	998
<u>P. floridanum</u> Nash ex Grant & Epling.....	1002
<u>Scutellaria floridana</u> Chapman.....	1006
<u>S. montana</u> Chapman.....	1010
<u>S. thieretii</u> Shinnery.....	1014
<u>Stachys lythroides</u> Small.....	1016
<u>Synandra hispidula</u> (Michx.) Baill.....	1019
SOLANACEAE	
<u>Solanum carolinense</u> L. var. <u>floridanum</u> Chapman.....	1021
SCROPHULARIACEAE	
<u>Agalinis pseudaphylla</u> (Pennell) Pennell.....	1025
<u>Amphianthus pusillus</u> Torrey.....	1030
<u>Aureolaria patula</u> (Chapman) Pennell.....	1035
<u>Penstemon dissectus</u> Elliott.....	1040
<u>Schwalbea americana</u> L.....	1045
LENTIBULARIACEAE	
<u>Pinguicula ionantha</u> Godfrey.....	1049
<u>P. planifolia</u> Chapman.....	1053
ACANTHACEAE	
<u>Justicia cooleyi</u> Monachino & Leonard.....	1057
<u>J. crassifolia</u> (Chapman) Small.....	1061
<u>J. mortuifluminis</u> Fernald.....	1065
PLANTAGINACEAE	
<u>Plantago cordata</u> Lam.....	1070
RUBIACEAE	
<u>Houstonia montana</u> (Chickering) Small.....	1074
<u>Hedyotis nigricans</u> (Lam.) Fosb. var. <u>pulvinata</u> (Small) Fosb.....	1078
CAPRIFOLIACEAE	
<u>Viburnum bracteatum</u> Rehder.....	1082
CAMPANULACEAE	
<u>Lobelia gattingeri</u> A. Gray.....	1086
ASTERACEAE	
<u>Aster avitus</u> Alexander.....	1090
<u>A. pinifolius</u> Alexander.....	1095
<u>A. plumosus</u> Small.....	1099

	Page
ASTERACEAE	
<u>Aster spinulosus</u> Chapman.....	1103
<u>Balduina atropurpurea</u> Harper.....	1107
<u>Brickellia cordifolia</u> Elliott.....	1111
<u>Cacalia diversifolia</u> T. & G. ....	1115
<u>C. rugelia</u> (Shuttlw. ex Chapm.) Barkley & Cronquist.....	1119
<u>Coreopsis intermedia</u> Sherff.....	1123
<u>C. latifolia</u> Michx.....	1127
<u>C. pulchra</u> F. Boynton in Small.....	1131
<u>Echinacea laevigata</u> (Boynt. & Beadle) Blake.....	1135
<u>E. tennesseensis</u> (Beadle) Small.....	1139
<u>Eupatorium luciae-brauniae</u> Fernald.....	1143
<u>E. saltuense</u> Fernald.....	1147
<u>Hartwrightia floridana</u> A. Gray ex S. Watson.....	1151
<u>Helianthus carnosus</u> Small.....	1155
<u>H. debilis</u> Nutt. ssp. <u>vestitus</u> (Wats.) Heller.....	1159
<u>H. eggertii</u> Small.....	1163
<u>H. glaucophyllus</u> D. M. Smith.....	1167
<u>H. schweinitzii</u> T. & G. ....	1171
<u>H. smithii</u> Heiser.....	1175
<u>Heterotheca flexuosa</u> (Nash) Harms.....	1179
<u>H. ruthii</u> (Small) Harms.....	1183
<u>Jamesianthus alabamensis</u> S. F. Blake in E.E. Sherff.....	1187
<u>Liatris helleri</u> T. C. Porter.....	1191
<u>L. ohlingerae</u> (Blake) Robinson.....	1195
<u>L. provincialis</u> Godfrey.....	1199
<u>Marshallia mohrii</u> Beadle & Boynton.....	1203
<u>M. ramosa</u> Beadle & F. E. Boynton.....	1207
<u>Polymnia laevigata</u> Beadle.....	1211
<u>Prenanthes roanensis</u> (Chick.) Chick.....	1216
<u>Rudbeckia auriculata</u> (Perdue) Kral.....	1220
<u>R. heliopsidis</u> T. & G. ....	1224
<u>R. nitida</u> Nutt.....	1228
<u>R. triloba</u> L. var. <u>pinnatifida</u> T. & G. ....	1232
<u>Senecio millefolium</u> T. & G. ....	1236
<u>Silphium brachiatum</u> Gattinger.....	1240
<u>S. confertifolium</u> Small.....	1244
<u>S. integrifolium</u> Michx. var. <u>gattingeri</u> Perry.....	1248
<u>Solidago albopilosa</u> E. L. Braun.....	1252
<u>S. pulchra</u> Small.....	1256
<u>S. shortii</u> T. & G. ....	1260
<u>S. spithamea</u> Curtis.....	1264
<u>S. verna</u> M. A. Curtis ex T. & G. ....	1268
<u>Verbesina chapmanii</u> J. R. Coleman.....	1273
<u>V. heterophylla</u> (Chapm.) Gray.....	1276
<u>Vernonia pulchella</u> Small.....	1279
<u>Viguiera porteri</u> (Gray) Blake.....	1283
Glossary.....	1287
Index.....	1304



AQUIFOLIACEAE

Ilex amelanchier M.A. Curtis. Service berry holly; holly

Technical Description

Tall shrubs, mostly 2-3 (-4) meters tall, with few to several erect or ascending stems from the root.

Stems.--The bark tight, smooth, gray-brown. Twigs slender but stiffish, spreading or ascending, seldom forming spur-shoots, the bark of new shoots mostly gray-brown, at first with scattered pale puberulence, later that season smooth and with a scattering of pale lenticels.

Leaves.--Deciduous, alternate, estipulate, oblong, elliptic, ovate or narrowly obovate, mostly 4-10 cm long, acute, rounded or short-acuminate, the margins toward the base usually entire, toward the apex ascending-low-toothed, the bases mostly broadly rounded on slender, spreading, puberulent stalks to 1.2 cm long; upper surface smoothish, dark green; lower surface rather rugose, villous-puberulent.

Inflorescence.--Flowers solitary or in small, short-stalked, cymes, the slender puberulent pedicels to 1 cm long.

Flowers.--Female flowers with 4-5 tomentulose, triangular sepals and the same number of oblong, whitish petals ca. 3.5 - 4.0 mm long, in full bloom in April.

Fruit.--Maturing in September, round, fully 1 cm broad on stalks to 1.5 cm long, the skin a deep, opaque red, the seeds (mericarps) with the outer face sharply few-ridged.

Distribution and Management Implication

Banks of streams through pine flatwoods, hardwood hammocks, titi swamps, and bogs, lower Coastal Plain, southeastern North Carolina southward to northern Florida, thence west into the Florida parishes of Louisiana.

Special Identifying Features

This rare species has fruit of a size and color comparable to Ilex opaca, largish leaves comparable to those of I. montana on twigs similar to those of I. ambigua. Its staminate flowers arise from a common peduncle (stalk) unlike those of related species.

Habitats and Management Implication

Management of the low forest or savanna I. amelanchier frequents if it involved selective logging of the hardwood and pine overstory complex would probably effect this species very little. However, it is definitely a part of a high hydroperiod complex of woody plants, so that any scheme involving drainage would eliminate I. amelanchier along with its associates such as Myrica, Ilex myrtifolia, Cyrilla, Cliftonia, Persea and Magnolia virginiana.

#### References

Chapman, A.W. 1860. Flora of the southern U.S.: 270. Cambridge, Mass.

Small, J.D. 1933. Manual of the southeastern flora, pp. 813-815. Chapel Hill, N.C.



SPECIES: #114 Ilex amelanchier M. A. Curtis Holly

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X				
Damage						X		
No Lasting Effect	NA							
Beneficial if Done Properly					X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Ilex amelanchier M.A. Curtis





AQUIFOLIACEAE

Ilex opaca L. var. arenicola (Ashe) Ashe. Sand-  
loving American holly; Holly  
I. cumulicola Small

Technical Description

Shrub or small tree, rarely reaching 20 feet and a d.b.h. of 8".

Stems.--The bark smooth, thin, tight, pale gray, the crown narrowish or broad, of usually ascending branches. Twigs with older bark gray, that of newer shoots gray or reddish-brown, stoutish, stiff, somewhat angulate. Buds ovoid-triangular, about 3-4 mm long, imbricate, the few scales reddish-brown, gray-appressed-hairy.

Leaves.--Persistent, alternate, mostly ascending on short, stiffish, puberulent stalks, the blades rarely longer than 6 cm long, oblong or obovate, rarely entire, more often with 3-4 pairs of strong, ascending spines above the middle, the margins strongly revolute the upper surfaces lustrous, yellowish-green, the lower surfaces paler, more yellowish.

Inflorescence.--Trees unisexual, the male flowers small, in small clusters on wood of the previous year, the female similar but in smaller clusters (solitary or up to 3).

Flowers.--Sepals of female flowers forming a 4-5 low-toothed cup, the margins entire of low-ciliate.

Fruit.--The largest of our hollies, on stout, puberulent stalks shorter than themselves, round, often fully 1 cm broad, a deep, opaque red when ripe, the nutlets (like hard segments of an orange) with backs having several low, rounded ridges.

Special Identifying Features

The var. arenicola is distinguished from var. opaca mostly by the more yellowish tints of the foliage, by the more ascending, more revolute leaves, the spines of which are directed forward, by the somewhat larger fruit, and by the less sharply ridged pyrenes (seeds, nutlets).

Distribution and Flowering Season

This small tree, blooming in late spring and early summer, is a component of the Sand Pine-evergreen scrub of the peninsular Florida highlands, and was most abundant there in the southernmost part of the highlands. Kurz and Godfrey (1962) indicate that it occurs occasionally in high sandy scrub in northeastern Florida, yet this may be a part of an extreme of I. opaca var. opaca. The same argument exists as to the northern limits of Osmanthus megacarpa, Carya floridana and other scrub trees comprising species pairs with more wide-ranging sclerophyllous species. The taxonomy is still not resolved.

#### Habitats and Management Implication

I. opaca var. arenicola in the strict sense has had a range that coincides fairly closely with the hardiness zone for citrus. Therefore, much of its former area has been converted to row culture of citrus and more is being converted annually. This, and the continuing conversion of south Florida highlands to retirement estates and other housing, make up the greatest hazard to the species. It was never abundant, never a stand former, but rather a minor element of the scrub. Its continuance is further risked by the dioecious character of the species, and the handsome foliage and fruit which makes it subject to vandalism.

#### References

Small, J.K. 1929. Plant novelties for Florida, Bull. Torr Bot. Club  
51: 379-393.

Small, J.K. 1933. Manual of the Southeastern Florida Flora, p. 816. Chapel Hill, N.C.



SPECIES: #115 Ilex opaca L. var. arenicola (Ashe) Ashe; Holly

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage							X	
No Lasting Effect	NA	→						
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Ilex opaca L. var. arenicola (Ashe) Ashe





Paxistima canbyi Gray

Status: Threatened

## Technical Description:

Low, lax, mat-forming shrub 2-4 dm high, increasing by rooting from the lower nodes and adventitiously along the prostrate older branches, the roots slender, shallow, fibrous.

Shoots: prostrate, sprawling or decumbent-based, slender, the older growth usually buried in litter, the rebranching often in pseudowhorls; bark of older growth dark brown, thin, forming irregular patterns of rectangular patches over the dull yellowish inner bark, that of newer growth paler brown, that of leafy shoots light brown, these shoots ascending or erect at least at tips, often subquadrangular, with 4, low longitudinal corky ridges, here ca. 1.0-1.5 mm thick, the nodes numerous and close together.

Leaves: opposite and close-set, spreading, evergreen, simple, subdecussate, stipulate, the stipules narrowly triangular-subulate, or linear, dark brown, minute, variably deciduous; petioles short, less than 1 mm long, erect-based, arching outward distally, the rounded backs pebbled; leaf blades leathery, oblong to narrowly elliptic, oblanceolate, narrowly cuneiform or linear, mostly 1.5-2.0 cm long, 2.0-5.0 mm wide, apically acute or (more often) rounded, strongly revolute-margined, serrulate with strongly incurved or erect, callus-tipped teeth, the base rounded, short-attenuate, or cuneate, the upper surface dark lustrous yellow-green with midnerve prominent, the pinnate laterals indistinct, the lower surface pale green, duller.

Inflorescence: The upper few to several nodes developing axillary, imbricate inflorescence buds, these elongating to become short, few-flowered, erectish, determinate racemes, the flowers of the lower nodes opposite, the terminal cluster a cymule of 3, or inflorescence a simple cymule of 3, the bracts subdecussately arranged, scale-like, triangular, the pedicels slender, terete, ascending, bibracteolate at base, mostly 3-4 mm long.

Flowers: regular, bisexual, small, the sepals 4, joined at very base, spreading, broadly ovate, ca. 1 mm long, broadly acute, somewhat cupped at the narrowed apex, greenish tinged with maroon; petals 4, distinct, strongly spreading, broadly ovate to suborbicular, attached to receptacle under the flange of a broad, green disc, slightly longer than the sepals (1.5 mm long), apically rounded, the margin erose, the surface bright maroon; stamens 4, hooked to the receptacle under notches in the broad margin of a large, flattish, green disc, this round, ca. 1.5 mm broad, the filaments stubby, ca. 0.4 mm long, erect, the anthers bi-gibbous, pale, the 2 round locules ca. 0.4 mm long; ovary superior but fused with disc so that only the very short, erect style and the shallowly bilobed stigma protrude.

Fruit: Capsule broadly ellipsoidal, slightly longer than 4 mm, 2-valved, 2 loculed; seeds pale, arillate, 1/locule.

## Distribution and Flowering Season:

Moist to dryish, shaded ravine slopes and bluffs, Appalachians and Appalachian Plateau, southeastern Ohio, and southern Pennsylvania southward through the Virginias into Kentucky and North Carolina

(here persisting in an old nursery site!) Flowering mostly in April, May.

#### Special Identifying Features:

The only other species of this genus in North America is western. Paxistima (usually spelled Pachystima) is distinguished from other native members of the Celastraceae by its low shrubby habit (it is our smallest member of the family), its oblong, unlobed fruit, its 2-locular (rather than 3-5-locular) ovary in which the ovules, later seeds, have a basal aril.

#### Habitat and Management Implication:

The common name "Cliff-green" describes the habitat rather well, in that this small shrub is most often found on steep, rocky ravine slopes or bluffs along Appalachian rivers and streams. The substrate is usually a shallow soil layer, very much humified, somewhat acid, although the underlying and surrounding rock is often calcareous or a calcareous shale. Sometimes the habitat is more exposed and drier, the forest open and high in yellow pine. More often the overstory is fairly heavy, may be a mixture of hardwoods such as *Quercus rubra*, *Q. alba*, *Ulmus*, *Acer saccharum*, *A. rubrum*, *Aesculus octandra*, *Tilia*, *Fraxinus*, etc. with gymnosperms such as *Pinus strobus*, *Tsuga canadensis*, *Thuja occidentalis*, sometimes *Pinus virginiana*, *P. echinata*, and an understory of *Rhododendron maximum*, *Kalmia*, *Clethra*, *Halesia*, various highbush *Vaccinium*. Herbaceous associates are quite varied but usually include a variety of ferns such as *Dryopteris marginalis*, *D. intermedia*, *Adiantum*, *Woodsia*, *Asplenium*, *Lycopodium*, *Trillium* (particularly *T. erectum*, *T. undulatum*), *Disporum*, *Polygonatum*, *Uvularia*, *Erythronium*, *Hepatica*, *Anemone quinquefolia*, *Hexastylis*, *Sanguinaria*, various umbellifers, etc.

These steep slopes, particularly toward their bases, may support fine specimens both of hardwoods and softwoods. Logging of such areas, if involving a clear cut, is highly destructive of the Paxistima habitat, in that the increased light promotes excessive drying as well as the advent of unwelcome woody weeds in genera Smilax, Lonicera, Rubus, etc. Also, such operations increase the likelihood of erosion of the thin humified layer the Paxistima roots in, so that the plants are likely to dislodge. In fact, these shrubs tend to increase by a form of air layering taking place along the prostrate shoot bases and branches, this rooting promoted by a loose, moist, surrounding duff. It should be recommended that logging of such areas be selection or group selection.

#### References:

- Fernald, M.L. 1950. Gray's manual of botany, ed. 8: p. 983.
- Massey, A.B. 1940. Discovery and distribution of Pachystima canbyi Gray. *Castanea* 5: 8-11.
- Radford, A.E., H.E. Ahles & C. Ritchie Bell. 1968. Manual of the vascular flora of the Carolinas, p. 685.

SPECIES: Paxistima canbyi A.Gray

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy						X		
Damage	X	NA	NA	NA			NA	
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.



Distribution of:

Paxistima canbyi Gray



RHAMNACEAE

Sageretia minutiflora (Michx.) Trel. Tiny-leaved buckthorn

Technical Description

Diffusely branching, arching, sprawling, evergreen, leaning or even viney shrub, often climbing into crowns of overstory.

Stems.--Oldest growth terete, with bark grayish, thin, tending to exfoliate in narrowly rectangular plates; more recent growth with bark smooth, reddish-brown, or brown with anastomosing shallow longitudinal cracks; branchlets numerous, some spur shoots modified to straight, spreading thorns, the leafy shoots also spreading (often in 2 ranks), slender, villous-puberulous with sordid hairs, tan or reddish-brown.

Leaves.--Opposite or nearly so, distichous, simple, stipulate, the stipules linear-triangular, 1.0-1.5 mm long, reddish-brown, early deciduous, the petioles spreading, 1-2 mm long, puberulous, the blades mostly broadly ovate to oblong-ovate, mostly 1.5-4.0 cm long, acute, crenate-denticulate, the narrowly triangular denticles directed upward, glandular, the base rounded or cordate, the texture firm but thin, the surface above dark green, glossy, conspicuously reticulated, the lower surface slightly paler, strongly reticulate, the midnerve and stronger laterals, sometimes the entire surface, puberulent.

Inflorescence.--Terminal on leafy branches, usually a system of elongated spikes from all or most axils of reduced upper shoot leaves, the spike axis puberulous, 3-4 cm long, the many small flowers sessile, distant toward the spike base, more crowded toward its tip, each subtended by 2-several small, unequal, narrowly triangular, villous-backed, reddish-brown, scale-like bracts.

Flowers.--Perfect, regular, small, very sweetly fragrant, broadly campanulate, nearly round, from base to tip of calyx ca. 1.5 mm high, about as broad; hypanthium shallowly cup-shaped, broadly rounded at base; calyx lobes 5, erect or with spreading tips, greenish-white, triangular, acute, ca. 0.5-0.6 mm long, rather fleshy, with 1 raised nerve above; petals 5, whitish, distinct, ascending, ca. 0.6 mm long, broadly oblong, short-clawed, retuse, apically somewhat cupped; stamens 5, opposite the petals, the anthers cupped within the fleshy filaments ca. 0.3 mm long, the broadly oblong anthers erect, ca. 0.4 mm long, apiculate; hypogynous disc a strong, fleshy annulus; ovary superior, ovoid, trilobed, ca. 0.6 mm high, the fleshy style ca. 0.3 mm long, the stigma lobes short, 3.

Fruit.--A drupe-like berry subtended by the spreading calyx lobes and bracts, nearly round, 6-9 mm long, the fleshy part thin, anastomosing-venose, the nutlets shaped somewhat like corn grains (broadly wedge-shaped).

Distribution and Flowering Season

Hardwood forest over limestone, sometimes on kitchen middens,

beach borders, Coastal Plain, North Carolina south into peninsular Florida, west in the Gulf Coastal Plain into Mississippi.

#### Special Identifying Features

Sageretia minutiflora is the only species of this small, primarily Asian genus to occur in the United States. Of our own genera of Rhamnaceae it is most similar to Rhamnus, differing from it in its shallower calyx tube (hypanthium?), its more prominent interstaminal disc, its less prominent stigmatic lobes. Also the southeastern area Rhamnus lack the sprawling, viney habit of S. minutiflora.

#### Habitat and Management Implications

This rather rare and local plant appears to prefer shade and a calcareous substratum. Optimal habitats are shaded shell sands, old kitchen middens, limesinks, low or high hammock with much limestone shallow or outcropping, usually along rivers or streams that flow through or over limestone. The plants in spite of their size are inconspicuous because of denseness of other understory vegetation, the primary shoots often reaching up into the crowns of lower trees so that only the exfoliating bark of the leafless lower parts of the Sageretia are evident. Associated overstory varies depending on the part of the range considered, to the north largely oak-hickory-maple, beech with Magnolia grandiflora in the Florida and Gulf Coastal sites, much Sabal palmetto in some Florida sites. Sabal minor is often present, sometimes Serenoa in the understory, together with frequent Ostrya, Carpinus, Myrica, Sebastiana, Persea, Ilex, Viburnum, Cornus, Bumelia, Rhamnus, etc. in varying proportions.

The plant is endangered primarily by clearcutting, and by residential and recreational site building. Much of its former area in Florida has now been converted. Selective or group selective logging, providing there is not excessive damage by the operation, likely has little effect on Sageretia in that the plants may sucker readily and actually are not obligate shade types. Clearcutting and subsequent site preparatory activity would be destructive. Fire is not an historical factor in the development of hammock vegetation, hence would be a destructive factor. One thing is certain. These plants are local in occurrence and little is really known about their ecology. In such instances it pays to find out what niche they occupy. Fortunately there are several populations of Sageretia on state or Federal lands in Florida, so that relatively undisturbed habitat for it is likely to remain available.



#### References

Small, J. K. 1933. Manual of the southeastern flora, pp. 830-834. Chapel Hill, N.C.

Radford, A. E., C. R. Bell, and H. E. Ahles. 1968. Manual of the vascular flora of the Carolinas, p. 694. Chapel Hill, N.C.

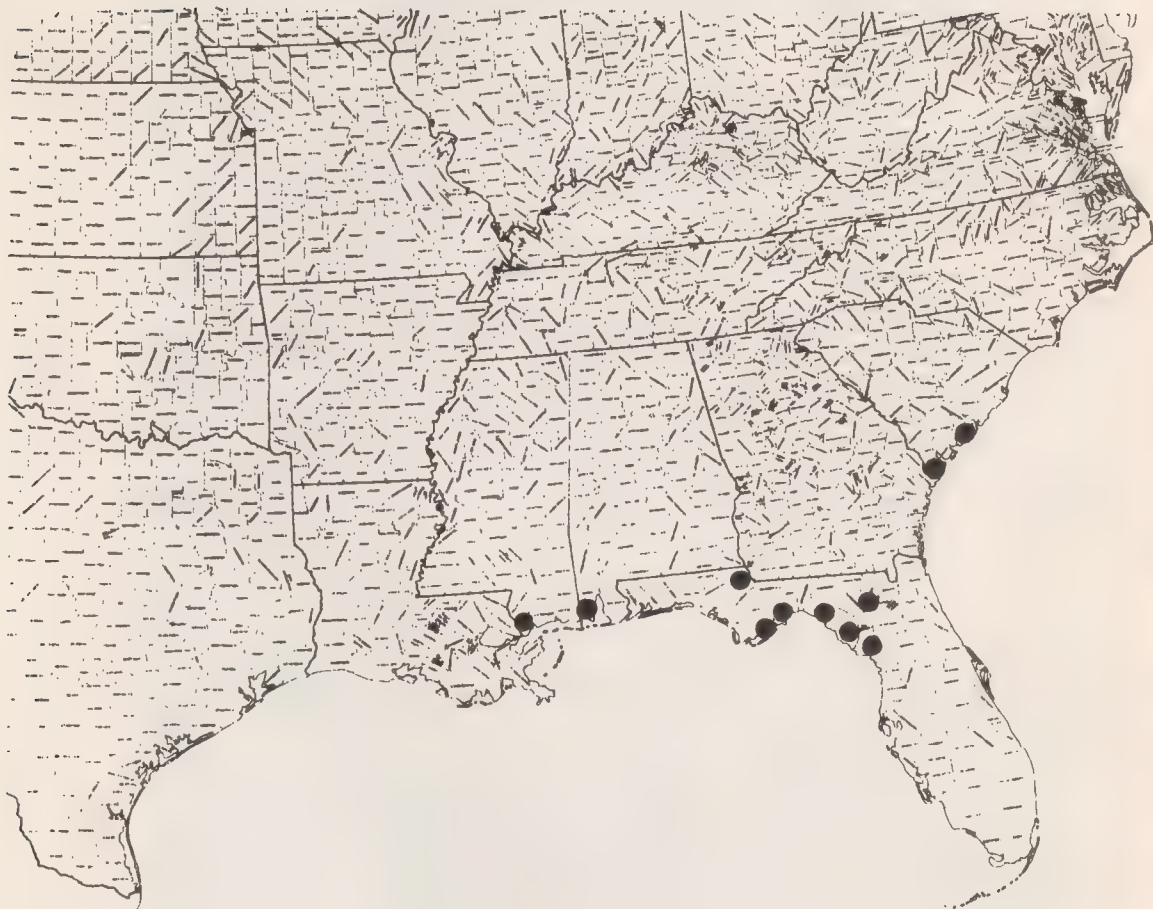
SPECIES Sageretia minutiflora (Michx.) Trel. tiny-leaved buckthorn

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X				
Damage						X		
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Sageretia minutiflora (Michx.) Trel.





MALVACEAE

Callirhoe papaver (Cav.) Gray var. bushii (Fern.) Waterf.

Bush's woods poppy-mallow

C. bushii Fern.

C. involucreata (T. & G.) Gray var. bushii (Fern.) Martin

Technical Description

Perennial herbs from carrot-like rootstocks.

Stems.--Stems solitary or few, erect or ascending or sprawling, mostly 5-8 dm tall, terete or (distally) subangulate, proximally purplish-tinged, distally pale green, simple to above the middle or sparingly branched from near base, the branches ascending, the surfaces with a scattering of appressed, stellate trichomes and, toward stem base these admixed with spreading or reflexed pilosity.

Leaves.--Both basal and cauline, alternate, stipulate, the rosette and lower stem leaves usually drying by anthesis, strongly petiolate, those at about mid-stem or just below it the largest; stipules ovate-triangular or narrowly ovate, acute, mostly 1-2 cm long, entire or sparsely toothed toward apex, strumose-hirsute marginally, the bases clasping, the lower surface sometimes puberulent; petioles much longer than blades on lower leaves, progressively shortening upward on stem, ascending, slender but stiff, hirsute; blades suborbicular to broadly ovate or reniform, 5-8 cm long, 5-10 cm wide, deeply and palmately lobed and parted into from 3-7 oblong to cuneate, rarely narrowly triangular, segments, these ascending-toothed from above the middle to the acute segment apex, the sharp-based sinuses cutting 1/2-2/3 of the way to the leaf base, which ranges from truncate to broadly or narrowly cordate; upper leaf surface deep yellow-green, pilose-hirsute, the lower surface somewhat paler, pilose-hirsute.

Inflorescence.--Flowers usually few per branch, loosely racemose, axillary to uppermost leaves, the peduncles 1-flowered, erect to ascending, at first barely longer than the flowers, in fruit elongating to ca. 1 dm, hirsute-and-stellate-hairy.

Flowers.--Regular, perfect, showy, each subtended by an involucre of 3, lance-linear to ovate, green, strumose-ciliate, upcurved bracts 1.0-1.5 cm long; sepals 5, green, united at base into a broadly campanulate cup 6-7 mm high, the lobes linear-triangular, to 2 cm long, slenderly tapering-tipped, the margins coarsely strumose-hirsute, the surface externally hirsute from lobe base to base of calyx, internally villosulous-tomentose; petals 5, joined at very base, ascending-spreading, a lively pale rose-purple, paler toward base, broadly obovate, 3.0-3.5 cm long, apically broadly rounded or truncate, erose, the short-clawed base internally pilose; stamens numerous, monodelphous, the staminal tube plus the free filaments and anthers ca. 1.5-2.0 cm long, the tiny anthers dorsifixed, yellow; carpels 10-20, forming a ring, the style parting above its base into a like number of linear branches, these narrowly stigmatic on the inner side.

Fruit.--Dry, the mature carpel becoming a firmly papery-walled (chartaceous) mericarp, these arranged in a ring around the center of the receptacle, each shaped much like the segment of an orange or tangerine, ca. 4 mm long, apically short-pointed, the backs coarsely raised-reticulate, 3-nerved, subapically bidentate with narrowly triangular teeth, the sides flat, peripherally rugose-reticulate, the attachment toward the base of the narrow inner angle; seeds reniform, ca. 3 mm long, somewhat laterally flattened, 1/mericarp.

#### Distribution and Flowering Season

Dryish, rocky open woodlands or glades, southwestern Missouri, northwestern Arkansas, eastern Oklahoma. Flowering from May into August.

#### Special Identifying Features

The species C. papaver is distinguished from other lobed-leaved sympatric Callirhoe by its combination of erect habit, pseudocalyx of 3 subfloral bractlets, deeply colored petals and conspicuous stipules. The nearest species to it is C. involucrata, which has procumbent or decumbent stems, and leaf divisions that are coarsely serrate. Var. bushii is distinguished from C. papaver proper by the spreading or retrorse, longer stem hairs, often by the broader leaf segments, these few-toothed toward the apex.

#### Habitat and Management Implications

C. papaver bushii is found in open calcareous or cherty-rocky woodlands, rocky banks and bluffs of ravines and streams, or at edges of limestone glades and barrens. Its tuberous rootstocks are usually rooted in clay. Overstory species in the area are characteristic of ozarkian uplands, namely Quercus alba, Q. stellata, Q. muhlenbergii, Q. rubra, Q. velutina, etc., Carya tomentosa, C. texana, C. glabra, C. ovalis, Ulmus rubra, U. americana, U. alata, Fraxinus americana, Acer saccharum, etc. Stands of juniper are common, pure or admixed with the hardwoods. Shrubs such as Rhamnus caroliniana, Rhus aromatica, Cornus, Andrachne, Hypericum are often present. Herbaceous associates include Delphinium, Arenaria, Sedum, Onosmodium, Talinum, Oenothera, Satureja, etc. in the more open areas, mostly indicators of rather basic soils.

The upland system into which this variety fits is being radically changed. Several of the major streams have been dammed, flooding out much of the bluff, dry bank, and glade habitat; expansion of the small towns in this region of heavy tourism has resulted in the loss of still more area as residential and recreational development moves outward. Much of the forest has been cut or poisoned away, so as to open up the rocky woodlands or so as totally to clear for pasture. Thus, with such a recent and

drastic alteration of much of the former habitat of this attractive plant, it should indeed be considered threatened.

#### References

- Martin, R. F. 1938. Miscellaneous notes on U. S. plants. *Rhodora* 40: 459-461.
- Robinson, B. L. & M. L. Fernald. 1909. Emendations of Gray's manual I. *Rhodora* 11: 33-61.
- Steyermark, J. A. 1963. Flora of Missouri, pp. 1048-1051. Ames, Iowa.
- Waterfall, U. T. 1959. C. papaver (Cav.) Gray var. bushii (Fern.) Waterfall, comb. nov. *Southwestern Nat.* 3: 215-216.



SPECIES Callirhoe papaver (Cav.) Gray var. bushii (Fern.) Waterf.

Bush's woods poppy-mallow

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Callirhoe papaver (Cav.) Gray var.  
bushii (Fern.) Waterf.



MALVACEAE

Iliamna remota Greene. Kankakee globe-mallow  
I. corei Sherff

Technical Description

Perennial shrub, bushy branched, with several strong shoots directly from a woody rhizome.

Stems: Main stem erect, ascending-branched, at base up to 1 cm. thick, terete, pale green, stellate-hairy, mostly between 1 and 2 meters tall.

Leaves: Alternate, simple, with early deciduous, lance-triangular stipules, on spreading-ascending slender but stiffish stellate-hairy petioles 3-6 cm. long, the blades of size and outline similar to Red Maple, broadly ovate to suborbicular, mostly 5-10 cm. long, (3-) 5-7-lobed, the lobes triangular with the terminal longest, the sinuses sharp-based but with an angle of 90° or slightly more, the lobe tips acute, the margins serrate to crenate-dentate, the venation palmate, the base truncate to cordate, both surfaces green, stellate-hairy. Lowest leaves the largest (lowermost usually absent by flowering time), gradually smaller upward on stem and branches, grading into progressively smaller bracteal leaves which at tips of shoot are shorter than the buds.

Inflorescence: Flowers symmetrical, Hollyhock-like, solitary or in pairs from leaf axis and forming elongate racemes with the lowermost fruiting calyces well-separate. Flower stalks spreading-ascending, in bloom 5-10 mm. long or less, stellate-tomentose, bearing at their tips, just below the calyx, 2-3 linear, densely stellate-tomentose bracts up to 1 cm. long.

Flowers: Calyx in bloom broadly campanulate to about 1.5 cm. long, the 5 triangular lobes slightly spreading, longer than the calyx tube, acute, externally 3-nerved, the backs stellate-hairy, inside cottony-tomentose. Petals 5, pink spreading, inequilateral, broadly obovate, 2.5-3.0 cm. long, retuse or emarginate, entire, the bases cuneate or attenuate to a short claw, this bristly-ciliate. Stamens numerous, fused into a tube 7-8 mm. high which is paper thin save for 5 strong nerves, the free upper parts of the filaments spreading horizontally toward the tube apex to form a "ball" of short 2-locular anthers, these purplish. Ovary superior, the surface densely coated with pale, erect, bristly hairs, the slender style with about 10 branches at the level of the stamen tips and clavate-tipped. Carpels numerous, arranged in a lobed ring, when mature oblong, 8-10 mm. long, with papery, veiny, smooth sides, densely stiff hairy margins, there opening to shed 2-4 rounded seeds.

Distribution and Flowering Season

Rocky open woods, bars of rivers, at a few isolated stations, one in northern Illinois on the Kankakee River, one in Indiana, and two in western Virginia. Flowering from June into early August.



### Special Identifying Features

This small genus is primarily western and northwestern with only this one occurring east of the Mississippi River. The species would be distinguished from eastern Hibiscus, Gossypium and Kosteletzkya by having more than 5 carpels, from Althaea, Malva, Callirhoe etc. by having 2 or more seeds/carpel, and from Abutilon, etc. by its beakless carpels.

### Habitats and Management Implication

The two Virginia stations are both in the Valley and Ridge province, both in open, primarily oak-hickory Virginia Pine, Pitch Pine forest with understory of Crataegus, Amelanchier, Cornus, Acer, Kalmia. The best known locality is on Peters Mountain, where the plants often tend to be unbranched and lower than in the other localities. According to Sherff (1949) the Virginia plants have odorless flowers, in contrast to the fragrant ones of the Illinois plants. He considered this Virginia material at first to be a variety (I. remota var. corei Sherff) then later (l. c.) treated it as a distinct species on the basis of its lower habit, odorless flowers, and relatively narrower and longer terminal leaf lobe.

### References

- Gleason, H. A. and A. Cronquist. 1963. Manual of the vascular plants of northeastern United States and adjacent Canada, 461-467.
- Sherff, E. E. 1946. Notes on certain plants in the Gray's manual range. *Rhodora* 48 (569): 89-96.
- \_\_\_\_\_. 1949. Miscellaneous notes on dicotyledonous plants. *Am. Journ. Bot.* 36: 499-511.

Revised March 1980

SPECIES: #67 Iliamna remota Greene, Kankakee globe-mallow

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X	X	
Damage								
No Lasting Effect								?
Beneficial if Done Properly					X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Iliamna remota Greene





HYPERICACEAE

Hypericum cumulicola (Small) P. Adams. Highlands scrub hypericum

Sanidophyllum cumulicola Small

Technical Description

Taprooted, short-lived, smooth perennial.

Stems: The shoots few to several, arching-ascending or erect, wiry, slender, zig-zag at level of the flowers, the bark gray or reddish-brown on older growth, this peeling away in thin flakes, on newer growth reddish brown or greenish brown. New shoots arising toward bases of the old, forming short leafy tufts.

Leaves: New short shoot leaves decussate, (in 4 ranks), overlapping, fleshy, short-linear, glandular-dotted, rarely longer than 3 mm., blunt. Stem leaves short-linear, similar to those of short shoots but more distant upwardly on stems, grading gradually into flatter, sharper, paired bracts in the inflorescence.

Inflorescence: A forking, zig-zag system of narrow racemes, the flowers 1/node, arising on a short, thick, erect pedicel slightly shorter than the sepals.

Flowers: Perianth regular, the calyx of 5 subequal to unequal erect sepals, about 3 mm. long, these separate, oblong to narrowly ovate or elliptic, the tips blunt or broadly acute, the margins entire, the bases slightly fused. Petals yellow, spreading, oblong, 3-4 mm. long, rounded or slightly emarginate. Stamens numerous, in groups of 4, each cluster with filaments slightly fused toward the base. Ovary superior, 3-carpellate, lance-ovoid, with 3 styles, each tipped by a stigma button. Fruit: Capsule lance-ovoid or elliptical, ca. 4-4.5 mm. long. Seeds short-oblong, about 0.5 mm. long, dark reddish-brown, with several rows of fine pits.

Distribution and Flowering Season

A species of the Sand Pine-evergreen scrub of southern peninsular Florida, blooming and fruiting throughout the year.

Special Identifying Features

This species in several respects, particularly in its taproot and wiry, scaly-leaved stems, and in its flowers, resembles the Pineweed, H. gentianoides (L.) BSP. It differs in being perennial, having somewhat larger flowers with more numerous stamens, and in being more branched in the inflorescence.

Habitats and Management Implication

Hypericum cumulicola is always on the deep sands of ancient dunes, either in clearings or "blowouts", and thus one of the many herbaceous species that play a role in early succession on such dunes. It probably has maintained its populations through occupation of small clearings produced by toppling of the sparse overstory species, or through seeding into larger clearings produced by fire.

Associated herbaceous cover is mainly Selaginella, Paronychia, mat-forming Euphorbias (Chamaecyce type), various dryland bunch-grasses such as Andropogon, Panicum, Aristida, Sorghastrum, some Cyperus and Rhynchospora.

Logging of the sort that would also remove the evergreen shrub understory, yet leave the sands themselves essentially undisturbed would favor the species providing adjacent seed sources are available. Burning would favor its increase, but is impracticable because of the dense, highly flammable nature of the scrub.

As is true of all other species in this complex, sclerophyllous community, the main risk is not so much from a cutting of the sparse pine-hardwood overstory as it has been from the wholesale creation of orange groves throughout the area or from the total eradication of the scrublands for the purpose of housing.

#### References

Small, J. K. 1933. Manual of the Southeastern Flora, pp. 874.

Revised March 1980

#83 Hypericum cumulicola (Small) P. Adams.  
 SPECIES: Highlands scrub hypericum

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage								
No Lasting Effect			NA					?
Beneficial if Done Properly	?	?			X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



Hypericum cumulicola (Small) P. Adams



HYPERICACEAE

Hypericum edisonianum (Small) Adams & Robeson. Edison's  
St. John's-wort; St. Peter's-wort; St. Andrew's-crosses  
Ascyrum edisonianum Small

Technical Description

Shrubs to 1.5 dm high, mostly erect at the base.

Stems.--The base terete or nearly so, smooth, the bark pale brown, repeatedly fork-  
ing-branching above, but essentially leafless save for uppermost branches, there  
densely leafy, all this from a woody, spreading, shallow root system.

Leaves.--Opposite, sessile, leathery, smooth, elliptic to oblong or broadly spatulate,  
mostly 1-2 cm. long, ascending, acute, or short-acuminate, entire, the bases  
rounded, slightly clasping, the upper surface glaucous-green, the lower surface  
paler and yellow-green, gland-dotted, with a raised midrib; stipules present as  
large reddish-brown glands at sides of blade bases.

Inflorescence.--Flowers symmetrical, terminating the numerous leafy branchlets, often  
their bases hidden by leaves, on erect or curved stalks 5-10 mm long, bearing 2,  
small, narrowly-triangular, scaly bracts well below the calyx base.

Flowers.--Calyx of 2 series, the outer series of 2 largest, erect, broadly elliptic  
or ovate, mostly 9-15 mm long, acute to short-acuminate, entire, the bases broadly  
rounded or cordate, clasping; inner pair concealed by outer, shorter, narrower,  
linear-lanceolate. Petals 4, subequal, 10-18 mm long, distinct obliquely obovate,  
yellow, spreading. Stamens numerous in a yellowish tuft. Ovary superior, ovoid,  
the carpels 3-4, styles 3-4, slender. This plant forms thickets, developing shoots  
at intervals from the spreading shallow roots.

Distribution and Flowering Season

Low prairies, sandy peaty shores, duneswales flatwoods, southern peninsular  
Florida. Flowers all year.

Special Identifying Features

This species is distinguished from the closely related Hypericum stans (Michx.)  
Adams and Robeson by its mainly narrower leaves and outer sepals and its much  
bushier habit.

Adams (1962) indicates that H. edisonianum has a range distinct from and south  
of, the widespread H. stans.

Habitats and Management Implication

H. edisonianum is restricted to a few counties in southern peninsular Florida  
(Highlands, Glade, DeSoto), and typically is on high hydroperiod soils of  
prairies, pondshores and pineland grass sedge clearings. Here it is admixed  
with a large variety of grasses, sedges, orchids, polygals, Ludwigia, etc.  
these amidst a scattering of palmetto. Periodic firing of these prairies and  
grassy clearings during dry seasons and droughts has helped to maintain such

species as this. Logging, if unaccompanied by drainage, increases H. edisonianum. Plantation level stocking shades it out. The plants, while not used by livestock are broken and trampled by them; improved pasture closes out their reproduction. This genus produces hypericin, a photosensitiser.

#### References

- \_\_\_\_\_. 1957. A revision of the genus Ascyrum (Hypericaceae). Rhodora 59(700):73-95.
- Adams, P. 1962. Studies in the Guttiferae I. A synopsis of Hypericum section Myriandra. Contr. Gray Herb. 189: 3-51.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 867-868. Chapel Hill, N.C.



SPECIES: #84 Hypericum edisonianum (Small) Adams & Robson. St. Peter's-wort  
or St. Andrew's - crosses

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Hypericum edisonianum (Small) Adams & Robs.



HYPERICACEAE

Paper 284  
Text & map by:  
Robert Kral

Hypericum lissophloeus P. Adams

Status: Threatened

Technical Description:

Tall (to 3.5 meters), deliquescent-crowned, smooth shrubs from shallow, widely spreading diffuse roots and frequently producing suckers from roots, the trunks usually simple, branching only in the upper part to form the spreading crown, toward base to ca. 3 cm thick, the lower bark thin, smooth and exfoliating into rectangular curling sheets like some birch, a metallic gray-brown or reddish-gray-brown, upwardly still smooth but tight, more reddish, slick-looking, the primary branches slender, spreading-ascending, elongated, with the reddish or reddish-gray bark exfoliating in thin, rectangular-anastomosing flakes, and producing a mixture of very leafy, larch-like spurshoots as well as normal branches, the latter slender, smooth, when fresh glaucous, often somewhat flattened or angulate, longitudinally ridged, with close-set nodes developing axillary fascicles, thus the branches and ultimate branchlets very leafy.

Leaves: lineal, opposite, sessile, persisting over winter, estipulate, needle-like, the clasping bases at a node joined by a narrow ridge of tissue extending from each margin base, thus leaf base appearing jointed (articulated) to the shoot, the longer blades (not those of spur or axillary shoots!) spreading - ascending, somewhat fleshy, narrowly linear, mostly 1.5-2.0 cm long, to 0.75 mm wide, the narrowed tips blunt-conic, the margins revolute, entire, the upper surface dull green (glaucous when fresh!), flattish or slightly concave, the midrib not evident, the rolled-down margin evidently gland-pitted; lower surface exposed as a narrow groove bordered by 2 low ridges, in combination all narrower than the combined width of the rolled-under margins.

Inflorescence: Flowers single or in cymes of 3 from axils of most of the upper branchlet nodes, the pedicels actually short shoots, usually each with a pair of bracts similar to foliage leaves, the actual pedicel usually shorter than the ovary, definitely shorter than the fruit.

Flowers: perfect, regular; sepals 5, early deciduous, similar to foliage leaves or very narrowly triangular-subulate, mostly 8-10 mm long, distinct to base, ascending or slightly spreading; petals 5, distinct, early deciduous, spreading, asymmetrically rectangular-obovate (as in *Rhexia*), 1.0-1.3 cm long, the broadly rounded or subtruncate apex bearing a spinulose apiculus laterally, the margin entire, the base subtruncate, the surface a rich orange yellow with darker orange veins; stamens very many, joined and crowded at their very base into a low ring around the ovary base, the slender deep yellow or orange-yellow filaments erectish or ascending, forming a mass around the ovary and nearly as long as the petals, the anthers round, pale yellow, dorsifixed; ovary superior, tricarpellate, the body lance-ovoid, smooth, tapering gradually into a narrow erect style that projects slightly above the pale yellow anthers.

Fruit: Capsule lance-ovoid, the body about 5 mm long, deeply 3-lobed, the 3 locules with many small seed, the apex acute, tapering into 3 persistent, now divergent, styles, the surface smooth, a dark



reddish-brown; seeds dark brown, oblong-curved (like a short banana), strongly longitudinally ridged-and-grooved.

#### Distribution and Flowering Season:

Shores and shallows of limesink lakes and ponds, Coastal Plain, northwestern Florida; flowering from late May through July and intermittently to frost.

#### Special Identifying Features:

This tall Hypericum is distinguished from other needle-leaved species of its genus first by its peculiar smooth bark that below separates like birch, but the metallic appearance of the bark of upper trunk and bases of larger branches, by the tallness and willowiness of habit, by the glaucousness of fresh shoots and leaves, and by the strongly ribbed character of the seed. According to Dr. Adams, monographer of sect. Myriandra (to which this species belongs!), two other very similar species, H. reductum and H. fasciculatum, grow mixed with this one but in no case have intermediates been observed.

#### Habitat and Management Implication:

H. lissophloeus is found on the fluctuating shores of a few sink ponds or small lakes in Bay and Washington Counties in northwestern Florida at about the longitude of Panama City. Around these ponds, it may be the most abundant shrub. At high water, its bases may be well submersed, only the waving tops of the upper branches exposed; on the other hand it may be well exposed at low stages and it is then that abundant seedlings and small specimens are in evidence. It may be in the light shade of scattered cypress but is more often luxuriating in full sun and there forming a forest in miniature. The substratum is a moist to quite wet sand, this frequently with a high peat increment, and quite acid. The herbaceous cover under and around the Hypericum is primarily grass-sedge with a sprinkling of Eriocaulon, Xyris, Drosera, Sabatia, Rhexia, Proserpinaca, Centella, Hydrocotyle, Ludwigia, various composites. The rare and local Xyris longisepala, X. isoetifolia, Rhexia salicifolia are frequently associated.

The limesink lakes and ponds are set in Longleaf Pine-deciduous scrub oak sandhills. Much of this area has, in recent years, been subjected to heavy mechanical disturbance, with the pine cleared, the oak and other hardwood scrub removed and with site preparation for plantation pine (mostly either Slash or Sand Pine). Damage to the ponds comes from erosion into them from the surrounding disturbed uplands, from overzealous clearing and bulldozing around the immediate shorelines (wherever these may be in a particular year!) and from increasing development of vacation or retirement housing around these lakes (which are scenic and once offered good fishing). There is also an unwarranted and steadily increasing number of campers, bathers, boaters, water skiers, picnickers and other

recreators that use any unposted shoreline. All of the above activities are damaging the plants of shallows and shorelines, as well as effecting water quality. On the other hand, if access to some of these ponds is restricted, if mechanical disturbance of the contiguous slopes is kept to a minimum or prohibited, there is no reason why some good populations could not be kept.

References:

- Adams, Preston. 1962. Studies in the Guttiferae I. A synopsis of Hypericum, sect. Myriandra. Contr. Gray Herb. 189: 3-51.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 868-874.

SPECIES: Hypericum lissophloeus P. Adams

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage No Lasting Effect	NA	X	X	X				
Beneficial if Done Properly								

Other Comments: Do not disturb shoreline vegetation. Do not drain areas of boggy shoreline.

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.



Estimated Range of:

Hypericum lissophloeus P.Adams



CISTACEAE

Hudsonia ericoides L. ssp. montana (Nutt.) Nickerson & Skog.  
golden mountain heather  
H. montana Nutt.

Technical Description

Low, much-branched shrub from a short, thick crown, the roots thickish.

Stems.-- Numerous, decumbent-based, often rooting at lower nodes, producing abundant spur shoots, the side branches arching upward, the whole plant forming a dense, often circular mat, the old shoot growth with bark dark reddish-brown, with numerous irregular narrow cracks revealing paler inner bark, the newer shoots with epidermis more reddish, the newest growth pale reddish-brown or tan, pilose.

Leaves.-- Alternate, ascending and overlapping in tight spirals from base to tip of shoots and spur shoots, linear, mostly 3-8 mm long, sometimes curved, greenish, firm, somewhat thickened, toward the base above somewhat concave, toward the apex thicker, the tips with a conic callus, the surfaces at first pilose, later nearly smooth.

Inflorescence.-- Flowers few to several, solitary from the tips of shoots and spur shoots, on slender, erect or ascending, pilose-tomentose peduncles mostly 5-10 mm long.

Flowers.-- Bisexual, regular; calyx turbinate, 5-7 mm long, the 5 sepals unequal, fused at base to a cup, the 2 longest lobes linear-subulate, the others lance-ovate, acuminate, the outer surface pilose-tomentose; petals 5, distinct, pale yellow, spreading, twice as long as the sepals; stamens distinct, smooth, up to 25, ca. 3 mm long, the anthers broadly ellipsoidal, ca. 0.3 mm long. Ovary superior, 3-carpellate, pilose.

Fruit.-- Capsule ovoid, ca. 3 mm long, pilose to base, splitting into 3 firm valves, 1 with the persistent, elongate style; seeds few, usually 2-3, asymmetrically oblong-ellipsoidal or ovoid, ca. 1 mm long, the surface covered with low, papillose, gray-white bumps.

Distribution and Flowering Time

Heath balds on granitic ledges and cliffs, Blue Ridge, western North Carolina (Burke County); flowering mostly in June and July.

Special Identifying Features

This differs from the subspecies "ericoides" (another mat-former on sandy soils, mostly in pinelands but sometimes on rocky mountain summits from Newfoundland south through New England and intermittently south into Delaware with an outlier in Chesterfield County South Carolina) in its broader calyx, the lobe tips of which are narrower, and in its somewhat shorter leaves.

Habitat and Management Implications

H. ericoides ssp. montana occupies small granitic clearings and ledges in the heath balds along the rim of Linville Gorge. It is usually rooted in

the shallow sandy soil of shallow depressions or cracks in the rock, is often at edges of growths of growths of Leiophyllum buxifolium, Hypericum densiflorum, Rhododendron catawbiense, Gaylussacia, Vaccinium, Lyonia, Leucothoe. It is normally at the edge of, or barely under, forest of Pinus strobus, P. rigida, P. virginiana, P. pungens, Tsuga caroliniana, T. canadensis, Quercus prinus, Q. coccinea, Carya ovalis. Frequent sprouts of Castanea dentata are in evidence. Fire was probably the main disturbance factor allowing periodic reduction of competition by both heath species and trees. The forest adjacent to the Hudsonia sites, even in its primal state was, because of the poorness of the soils and the difficulty of topography, probably not of a high potential for timber. Presently, the main threat to survival of these rare plants is the damage done them by trampling feet of rock climbers and hikers.

#### References

- Bozeman, J.R. and J.F. Logue, 1968. A range extension for Hudsonia ericoides in the southeastern U.S. Rhodora 70: 289-291.
- Nuttall, Thomas. 1818. Genera of North American Plants II: p. 4.
- Radford, A.E., E. Ahles and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas, p. 718. Chapel Hill, N.C.
- Small, J.K. 9133. Manual of the southeastern flora, pp. 880-881. Chapel Hill, N.C.



SPECIES Hudsonia ericoides L. ssp. montana (Nutt.) Nickerson & Skog.  
golden mountain heather

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								
No Lasting Effect								
Beneficial if Done Properly	?				x	x		

Other Comments: effect of grazing not observed, but likely  
to be detrimental

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Hudsonia ericoides L. ssp. montana (Nutt.) Nickers. & Skog



CISTACEAE

Lechea cernua Small. Nodding pinweed; Pinweed

Technical Description

Shrublike perennial herb, usually from a deep taproot and with several spreading, ascending or erect shoots from a branching caudex.

Stems.--New shoot growth usually spreading, forming overwintering "rosettes", the shoot surfaces and the broad (around 0.5 cm long) ovate or elliptic new shoot leaves tomentose with white hairs. Flowering shoots up to 5 dm tall, woody, much branched at least above the middle, the secondary branches again rebranching, the crown of a shoot therefore with a ovoid or pyramidal aspect, the shoot surfaces reddish, but cloaked with appressed grayish or whitish hairs.

Leaves.--All but the uppermost shoot leaves of fertile shoots absent by flowering time (these thus usually confined to the numerous branchlets), narrowly ovate or elliptic, sessile or short stalked, 1 cm long or less, very firm, acute, sometimes mucronate or apiculate, entire, the bases cuneate, the surfaces slightly to copiously appressed hairy.

Inflorescence.--Flowers solitary or in small fascicles in the axils of upper leaves of branchlets, on appressed-hairy stalks 1.5-2.5 mm long.

Flowers.--Calyx ca. 2 mm long, sepals 5 fused to form a pyriform outline, the inner 3 lobes broadly obovate, the backs appressed-hairy, much longer than the short-linear outer 2. Petals short, reddish, lost just after anthesis. Stamens 5-15.

Fruit.--Capsule ellipsoidal or ovoid, dull, about 2 mm long, slightly surpassed by or equalling the inner sepal tips, the valves blunt, firm. Seeds 1 or 2, equilateral to irregular, slightly more than 1 mm long, dark brown, the dorsal surface convex.

Distribution and Flowering Season

Sandy rises, sandhills and sandhills scrub, mostly in the sand-pine type, southern peninsular Florida. Flowering July, August.

Special Identifying Features

This species is part of the complex in which the outer sepals are shorter than the inner sepals, and in which the ripe capsule is exceeded by or slightly exceeds the calyx. Within that complex it is the only species in which both stem leaf surfaces are hairy and in which the basal leaves are very densely so on both surfaces.

Habitats and Management Implication

L. cernua is always found in deep sands, usually ancient dunes, on which the most common forest is a mixture of evergreen scrub oaks such as Q. maritima, Q. myrtifolia, Q. chapmanii, hickories such as Carya floridana, other scrub species such as Ceratiola, Osmanthus, Lyonia, palmetto. The dominant pine is P. clausa,



with P. elliottii and P. palustris occasional. The lechea may be found under mature scattered pine or oak, but is more frequently in sandy openings along with species of Andropogon, Aristida, dryland species of Rhynchospora such as R. megalocarpa, Cyperus. Fire has probably helped to maintain the clearings it naturally frequents. Drastic soil disturbance such as logging probably increases it. Site preparations involving exposures of the sandy substrate, so long as there are contiguous areas to provide a seed source, increase this species.

#### References

- Hodgdon, A. R. 1938. A taxonomic study of Lechea. Contribs. Gray Herb. CXXI: 29-131, plates 488-491.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 881-884. Chapel Hill, N.C.
- Wilbur, R. L. and H. S. Daoud. 1961. The genus Lechea (Cistaceae) in the southeastern United States. Rhodora 63 (748): 103-118.

SPECIES: #20 Lechea cernua Small, Pinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage								
No Lasting Effect	NA		NA					
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lechea cernua Small





CISTACEAE

Lechea divaricata Shuttlw. Pine pinweed, pinweed

Technical Description

Somewhat shrubby perennial herb to 5 dm.

Stems.--All shoots developing flowers (no resting shoots produced), with several spreading from a taproot with a branched lower stem, the young shoots numerous, very hairy at first, as they develop arching outward, then upward, or sprawling, branchlets numerous, spreading, all shoots and branches spreading-hairy.

Leaves.--Spirally arranged, the basal ones scattered, the ones on the secondary shoots and branchlets rather close-set, spreading, lanceolate to elliptic or oblong, 3-8 mm long, sharply acute, entire, firm, nearly sessile, the lower surfaces pilose with long white hairs, the upper surface smooth.

Inflorescence.--Flowers produced along all or most the length of the mostly short ultimate branches, rather numerous, the whole inflorescence of a branch rather narrow, often cylindric, on the lower branches usually from axils of bract leaves, on the upper branches as bractless, compact racemes. Flower stalks 1.0-1.5 mm long, strongly appressed-hairy.

Flowers.--Calyx lobes 5, the calyx ca. 2 mm long, the fused portion campanulate, the lobes slightly spreading or erect, the inner three broadly ovate, rather cup-shaped, hairy-backed, the outer 2 much shorter, linear. Petals reduced, Stamens numerous, 15-25.

Fruit.--Capsule elliptic-ovoid, about 2 mm long, its tip projecting conspicuously beyond the sepal tips, lustrous. Seeds 1-4 but only 1 usually maturing, about 1 mm long asymmetrically oblong, round angled and with large irregular concavities.

Distribution and Flowering Season

Mostly in sand pine sandscrub, central and southern peninsular Florida, July-October.

Special Identifying Features

This species is like the widespread L. villosa in the spreading hairs of its stems and lower parts of branches, but differs in its slender, more spreading, habit, in its more exserted capsule which does not split at maturity. Also its leaves are smaller, shorter.

It is one of 2 species whose exterior sepals are shorter than the interior ones, and whose capsules are much longer than the calyx. Here it differs from L. deckertii in its spreading (versus more appressed) stem pubescence, its thicker walled capsules, its broader leaf outlines.

Habitat and Management Implication

The habitat of L. divaricata is similar to that of L. cernua and the management implications are the same.

L. divaricata is always found in deep sands, usually ancient dunes or ecotonal to moister duneswales, on which the most common forest is a mixture of evergreen scrub oaks such as Q. maritima, Q. myrtifolia, Q. Chapmanii, hickories such as Carya floridana, other scrub species such as Ceratiola, Osmanthus, Lyonia, palmetto. The lechea may be found under mature scattered pine or oak, but is more frequently in sandy openings along with species of Andropogon, Aristida, dryland species of Rhynchospora such as R. megalocarpa, Cyperus. Fire has probably helped to maintain the clearings it naturally frequents. Drastic soil disturbance such as logging probably increases it. Site preparations involving exposures of the sandy substrate, so long as there are contiguous areas to provide a seed source, increase this species.

#### References

- Hodgdon, A. R. 1938. A taxonomic study of Lechea. Contribs. Gray Herb. CXXI: 29-131, plates 488-491
- Small, J. K. 1933. Manual of the southeastern flora, pp. 881-884. Chapel Hill, N.C.
- Wilbur, R. L. and H.S. Daoud. 1961. The genus Lechea (Cistaceae) in the southeastern United States. Rhodora 63 (748): 103-118.

SPECIES: #21 Lechea divaricata Shuttlw. pinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage								
No Lasting Effect	NA		NA					
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Lechea divaricata Shuttlw.



CISTACEAE

Lechea maritima Legg. var. virginica Hodgdon. Virginian pinweed

Technical Description

Short-lived shrub, the branches from a short, erect or ascending caudex and a strong, irregularly branched rootstock.

Stem.-- Woody, 1-several, stoutish, stiff, erect or decumbent based or leaning with branches erect and unilateral, the bark dark reddish-brown, longitudinally shallowly cracked, the main axis frequently and diffusely branched to below the middle, usually also producing 1 or more pseudowhorls of basal shoots. Newer shoots and basal shoots with axis pilose-tomentose with whitish hairs.

Leaves.-- Alternate and opposite or whorled (particularly on basal shoots), sessile, usually close-set, those of the basal (overwintering) shoots narrowly elliptic or lanceolate, mostly 5 mm long or less, acute, entire, pilose-ciliate, the upper surface green, nearly smooth, the lower surface pilose-tomentose, thus whitened; leaves of fertile shoots (lower ones absent by flowering time) elliptic-linear, 1 cm or less long, 1 mm wide or less, the tips acute, callused, the margins entire, the bases acute, sessile or short-petiolate, the upper surface yellow-green, smooth, the lower surface strigose-pilose with white hairs.

Inflorescence.-- Flowers numerous, arising singly from the axils of most middle and upper leaves of the abundant shoots, thus producing a leafy-bracted, compound, broadly triangular, panicle.

Flowers.-- Nearly regular, bisexual, obovoid to nearly round or ovoid, 1.5-2.0 mm long; sepals 5 in 2 series, the outer series of 2 linear, the inner 3 scale-like, ovate, cupped around the ovary and fruit, longer than the outer pair, all on the backs pilosulous-tomentose; pedicels stiffly erect or outcurved, tomentose, mostly 1-2 mm long, dilated at summit; petals 3, papery, reddish, shorter than inner sepals, withering and persistent around the fruit; stamens 3-25, about as long as the inner sepals, arising from the receptacle, distinct, the filaments slender, the short anthers nearly round, yellowish; ovary superior, 3-carpellate, smooth, ovoid, the stigmas 3, nearly sessile, fimbriate, reddish.

Fruit.-- An ovoid, 3-valved, smooth capsule ca. 1.5 mm long; seeds 2 (-3)/capsule, ca. 1 mm long, smooth, brown, narrowly ovoid, the backs convex, the inner surface flattish or broadly angled.

Distribution and Flowering Time

Sands of dunes and clearings close to seacoast, southeastern Virginia; flowering from August to frost.

Special Identifying Features

This plant is distinguished from other pinweeds by a combination of the following characters:

1. Outer sepals shorter than inner.
2. Basal leaves (lower overwintering shoot leaves) more than three times

as long as broad; basal shoots present at and past anthesis.

3. Fertile branches from main shoot from well below the middle to apex (often unilateral on spreading main stems!)
4. Capsule hardly as long as inner sepals; seeds usually 2/capsule.

It is distinguished as a variety of L. maritima by its fewer seeds (L. maritima usually has 4/capsule), its tendency to branch from a lower stem level, and by its more shrubby habit (branches remaining alive for more than 1 year!)

#### Habitat and Management Implications

L. maritima virginica occupies a narrow zone along the coast in eastern Maryland and southeastern Virginia; it was most abundant on sandy clearings and coastal dunes from Fort Henry south to the area of Virginia Beach and Back Bay. It is either on shifting sands of the dunes, or in sandy clearings in oak-pine scrub (the oak often scrub Quercus virginiana), or on sandy rises in brackish marsh. The main danger to the plants is from extensive development of areas along beaches for housing and recreational sites.

#### References

- Fernald, M.L. 1950. Gray's manual of Botany, ed. 8, pp. 1018-1022. Boston, Mass.
- Hodgdon, A.R. 1938. A taxonomic study of Lechea. Rhodora 40 (470,471), 131 pp., pl.



SPECIES Lechea maritima L. var. virginica Hodgdon. Virginian

pinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	NA
Damage								
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lechea maritima Legg. var. virginica Hodgdon



## VIOLACEAE

Viola egglestonii Brainerd. Eggleston's violet

## Technical Description

Perennial, rosulate, smoothish herbs from a fleshy, stoutish-cylindrical, erect or ascending rhizome 0.5-1.0 cm thick.

Leaves.--All basal; stipules linear-triangular, pale green tinted with pink, thin, entire or remotely ciliate; petioles various in length, those of earliest leaves usually shorter than the blades, increasingly lengthening through the season and longer than the blades, smooth, or sparingly villosulous, fleshy, half-terete, the backs rounded and ribbed, the inner side (ventral) usually concave; blades mostly 1.5-6.0 cm long, pale green on both faces, the earliest ones mostly broadly ovate to suborbicular or reniform, broadly acute to obtuse or rounded, the margins crenate or crenate-serrate, the bases truncate or cordate, also attenuated on the petiole; later leaves becoming progressively more dissected, usually involving a seasonal series from triangular and more lacerate-serrate or incised, with bases truncate-hastate, to ovate and deeply palmatifid, the (5-) 7-11 segments narrowly oblanceolate or spatulate, or with the medial segment broadest, sometimes itself broadly oblong, ovate or elliptic with the laterals few, basal, narrow, saliently spreading, the lobe margins low-serrate, the blade base cuneate to truncate, or with lower lobes reflexed; surfaces usually glabrous.

Inflorescence.--Flowers several per plant, solitary at peduncle tips and of two sorts, petaliferous ones (chasmogamous) showy, appearing early in the season on ascending or erect peduncles, giving way later in the season to inconspicuous cleistogamous ones on horizontally oriented peduncles; peduncles of chasmogamous florets slender, about as long as the leaves, bracteolate, the small, subulate, red-tinged bracts appearing about midway up, the peduncle apex bent to the flower.

Flowers.--Chasmogamous flowers zygomorphic, bisexual; sepals 5, distinct, narrowly triangular, slightly unequal, the longest ca. 9 mm long, broadly auricled at base, projecting forward in the flower, thinnish, pale green with maroon tints, in fruit with tips spreading-reflexed; petals 5, distinct, the lowest somewhat larger, ca. 1.5 cm long, basally with a saccate spur that projects backward between the bases of the lower pair of sepals, the blade obovate, projecting forward, the lateral petals narrower, projecting forward and outward, internally bearded medially toward blade base, the upper pair of petals broadest and apically most spreading; petal surfaces a lively blue-violet in the blade, grading to pale blue or nearly white with deep blue-violet veins toward the base (this giving the flower a distinct "eye"); stamens 5, the filaments very short, broad, each projecting beyond a broadly oblong, pale, introrse anther to form a triangular scale, the whole structure



forming a cylinder around the style; ovary superior, 3-locular, the single style apical, bent slightly above its base and distally dilated into the capitate stigma.

Fruit.--A broadly oblong, pale yellowish-green, loculicidal capsule 1.0-1.4 cm long, the numerous seeds narrowly obovoid, ca. 2 mm long, smooth, pale brown.

#### Distribution and Flowering Season

Heavy, thin, soils over limestone, glades and clearings, Interior Low Plateau, middle Kentucky south through middle Tennessee into northwestern Georgia and northern Alabama. Chasmogamous flowers from early March into May; cleistogamous flowers from May to frost.

#### Special Identifying Features

The stemless blue violets probably comprise the most difficult taxonomic problem remaining in the southeastern U.S.A. There are several other "species" that have similar patterns of variation of leaf and some doubtlessly hybridize with V. egglestonii, particularly on disturbed habitat. The most likely contaminant is V. palmata (including V. triloba, V. sororia in some treatments) with V. affinis LeConte (incl. V. papilionacea, V. missouriensis, etc.) a close second. Taxonomically however, V. egglestonii is most like the palmatifid-leaved V. pedatifida, a prairie species with which it does not share range. The only consistent difference between the two is in the behavior of the peduncle of the cleistogamous flower, which in V. egglestonii is prostrate, sometimes buried shallowly in the substrate or creeping over the surface and which in V. pedatifida is erect or suberect. It differs from most species in the V. palmata complex in that, in the latter the young leaves are generally somewhat pubescent, and there is usually some pubescence even in older foliage.

#### Habitat and Management Implications

V. egglestonii is frequent or fairly common in most of the open limestone glades of middle Tennessee, rather rare and local elsewhere in its small range. Its soil preferences are for a dark, humified clay, a product of the in-place and transported weathered limestones which always underlie the plants. Common herbaceous associates are those typical of limestone glades and include Sporobolus, various Dichanthelium, Panicum, Carex, Juncus filipendulus, Arenaria patula, Satureja, Scutellaria parvula, Delphinium virescens, Sedum pulchellum, various Leavenworthia, Lesquerella, Petalostemon gattingeri, Psoralea subacaulis, Astragalus tennesseensis, Onosmodium molle, Lithospermum canescens, Opuntia compressa, etc. The site ranges from very moist to quite dry in a single season. As do other species of open limestone

glades, this violet tends to disappear as the surrounding woody vegetation invades, so that as Juniperus (the common first arborescent invader) close crowns, V. egglestonii becomes scarce and is totally absent by the time the overstory succession reaches climax. Thus, as is true also of other open glades plants, V. egglestonii was probably maintained historically by a combination of natural woods fires and erosional forces that would tend to create either outcrops or shallow soils. In that the plants are cormophytic and low, they tend to persist, even increase, under conditions of extreme disturbance such as lot development, high grazing intensity, etc.

#### References

- Brainerd, Ezra. 1910. Five new species of Viola from the South. Bull. Torr. Bot. Club 37: 523-527.
- \_\_\_\_\_. 1921. Violets of North America. Vermont Agric. Expt. Sta. Bull. 224. 205 pp. Burlington, Vt.
- Russell, N. H. 1965. Violets (Viola) of central and eastern United States: an introductory survey. Sida 2 (1): 1-113.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 884-894. Chapel Hill, N. C.

SPECIES Viola egglestonii Brainerd. Eggleston's violet

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			X	
Damage								
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Viola egglestonii Brainerd



LYTHRACEAE

Cuphea aspera Chapm. Tropical waxweed

Parsonsia lythroides Small

Technical Description

Perennial from a woody, horizontally branched rootstock, this putting out slender offshoots terminating in spindle-shaped tubers which in turn develop shoots.

Stems: Few to several, either directly from old rootstocks or from slender offshoots, erect, stiffish, but slender, terete, mostly 2-3 dm. tall, hirsute with white, spreading, glandless hairs and somewhat longer, purplish, glandular hairs, thus sticky.

Leaves: Stem leaves opposite or in 3's, nodes numerous but well spaced, the blades sessile or nearly so, spreading, the lowest smallest, broad, the largest at about mid-stem, elliptic or lanceolate, acute, entire, the surfaces scabrous with short sharp appressed hairs, the margins scabrid. Leaves shortening and narrowing as the inflorescence is approached, there grading into mostly opposite, linear or spatulate bracts.

Inflorescence: Flowers mostly opposite or in 3's at the upper nodes and on strongly ascending, slender, hirsute stalks to ca. 1 cm. long, the inflorescence rather narrow and elongate, simple or few-branched.

Flowers: Sepals joined into a tube, this asymmetrical, narrowly oblong, spreading at orifice, about 12-ribbed, in flower 7-8 mm long, strongly maroon-tinted, the orifice 6-toothed, the surface bristly hairy with a mixture of spreading, broad-based, purplish, glandular hairs and appressed glandless white hairs. Petals mostly 6, spreading, unequal, the longest, 8-10 mm long, narrowly spatulate, smooth, pink, or white, thus the flowers in full bloom showy, phlox-like. Stamens about 12, unequal, attached to upper part of calyx tube below the teeth, mostly included or the longer ones slightly protruding from calyx mouth. Fruiting calyx irregularly narrowly urn-shaped, the body base oblique with the upper part produced into a pouch, the body necked, then flaring into a broadly funnelform, triangular-toothed limb.

Fruit: Capsule enclosed in the calyx, 3.5-4.5 mm long.

Distribution and Flowering Season

In pine flatwoods savannas of northwest Florida. Flowering mostly in June and July.

Habitats and Management Implication

Cuphea aspera is yet another of the numerous yet rare Florida endemic species discovered or described by Dr. Chapman. It is often mingled with or near other rarities such as Verbesina chapmanii, Scutellaria floridana, Macbridea alba. Optimal habitat is savanna, with a moist black sandy peat

over gley which never dries out, and a herbaceous association that is primarily grass-sedge with a scattering of wax myrtle, gallberry, heaths, palmetto in the shrub layer and an overstory scattering of longleaf and slash pine. Fire has unquestionably had a bearing on maintenance of this species, which is a cormophyte that rapidly responds to burning by production of flowering shoots. Removal of fire promotes expansion of grass genera such as Aristida, Andropogon, Panicum, as well as shrubs so that such forbs as this are crowded out, or shaded out. The species must not be shade tolerant in that it is not found in heavy stands of pine or in shrub thickets. Thus clear-cutting would probably not affect it adversely. Site preparation of any sort that would disturb the soil of an entire block would not be advisable. Bedding would be acceptable were the beds wide apart enough to admit sufficient light to the undisturbed strips; however any plantation that would have complete crown closure would eliminate this species. Most collections of C. aspera are old, most show plant bases charred by fire. This could indicate that the plant is now not as frequent as once it was, and probably because of better fire protection within the area.

#### References

Small, J. K. 1933. Manual of the Southeastern Flora, pp. 931-932.

Revised March 1980



SPECIES: #143 Cuphea aspera Chapm. Tropical waxweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Cuphea aspera Chapman



LYTHRACEAE

Lythrum curtissii Fernald. Curtiss' lythrum

Technical Description

Subshrubby, smooth, perennial herb from a shallowly spreading, diffuse rootstock, the larger roots often spongy-thickened  
Stems.--Solitary or in small clumps, bowed outward at base, but ascending or erect, the bark toward stem base thin, gray-brown or reddish-brown, cracking and anastomosing longitudinally to reveal paler inner bark, proximally terete, often spongy (if submersed), distally becoming quadrangular, narrowly winged, the lower part of the stem usually leafless by flowering time, the branching abundant from about the mid-stem up, slender, ascending, the lower branches often rebranched in the same way.

Leaves.--Numerous, alternate, subsessile, estipulate, ascending or spreading, those of main stem by far the largest, (but by flowering time usually deciduous from just below the inflorescence to stem base), mostly oblong to narrowly elliptic, acute, entire, mostly 1.5-3.0 cm long, the upper surface deep green or tinged with purple, the lower surface markedly paler, the principal venation pinnate, the lateral veins arcuate; leaves of branches and upper portion of main axis grading smaller, more numerous, alternate to subopposite, mostly ascending or erect.

Inflorescence.--Flowers borne singly in axils of most leaves of branches and upper axis on stiff, ascending pedicels rarely as long as 1 mm.

Flowers.--Somewhat zygomorphic, bisexual; calyx at anthesis forming a cylindro-clavate tube 3-4 mm long, this green with 10-12 purplish ribs and terminating in 4-6, low-triangular-subulate-tipped lobes, these alternating with narrow, spreading appendages from the sinuses; petals (4-) 6, distinct, arising and spreading from the calyx tube orifice, a lively lavender-rose, somewhat unequal, ca. 2 mm long, obovate to oblong or elliptic, acute at both ends; stamens mostly 6-12 of various lengths, the elongate, slender slightly flattened filaments arising from calyx tube base and extending well beyond its orifice, terminating in cinnamon, broadly ellipsoidal or oblong, versatile anthers ca. 0.4 mm long; ovary superior, short-cylindric, included in calyx, bicarpellate, terminating in a filiform, exserted, capitate stigma.

Fruit.--Capsule cylindro-clavate, ca. 3 mm long, smooth, pale reddish-brown, 2-loculed; seeds numerous, pale brown, oblong, concave-flattened, ca. 0.5 mm long.

Distribution and Flowering Season

Bogs, seeps, clearings in and edges of acid or calcareous swamps,



northern Florida and southwestern Georgia; flowering July into September or October.

#### Special Identifying Features

L. curtissii is most similar to L. alatum var. lanceolatum, and is nested within its range. It differs mainly in its smaller calyx tubes (4-5 mm versus 6-8 mm), its thinner, longer leaves of main stem, and its more remote rameal (branch) leaves.

#### Habitat and Management Implications

L. curtissii is a plant of high hydroperiod soils, usually silts, fine sands, or peat-muck. Its accepted range falls within the karst country of northwestern Florida and southwestern Georgia, where it may be found around the shallow ponds, in shallow boggy depressions in flatwoods, in roadside ditches, or in bays and river or creek swamps. Usually it is either in light shade or full sun, the surrounding overstory ranging from longleaf and slash pine with saw palmetto and gallberry in the understory to cypress-tupelo or titi. Sometimes it is at the edges of Hypericum ponds. In any event, the substrate is seasonally very wet. Commonest herbaceous associates are grass-sedge-rush, with an admixture of Xyris, Eriocaulon, Rhexia, Bacopa, Ludwigia, Polygala.

The greatest danger facing this very local species is the conversion of large parts of its former range to slash pine, this preceded by clearcutting, mechanical site preparation, and especially by cutting of drainage ditches. A permanent drying out of the site destroys L. curtissii even before crown closure of planted pine would shade it out. In such pine plantations the Lythrum persists only along these ditches.

#### References

- Fernald, M. L. 1902. Some little known plants from Florida and Georgia. Bot. Gaz. 33: 154-157.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 930-931. Chapel Hill, N.C.

SPECIES Lythrum curtissii Fernald. Curtiss' lythrum

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments: drainage of this habitat is detrimental.

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Lythrum curtissii Fernald





LYTHRACEAE

Lythrum flagellare Shuttlw. lowland lythrum

Technical Description

Perennial, creeping, mat-forming, smooth herb.

Stems.--Older stems entirely prostrate, slender, wiry, dark brown, the thin bark cracking longitudinally, sometimes exfoliating; newer shoots ascending, arching or prostrate, wiry, quadrate, very narrowly winged, mostly leafy to the base.

Leaves.--Opposite, estipulate, simple, spreading and often upright (thus appearing secund) on reddish petioles 1.5 mm long or less, or sessile, the blades oblong to elliptic or even suborbicular (these usually the lowest ones on a shoot), mostly 0.7-1.3 cm long, apically rounded or obtuse-angled, the margin entire, glassy-papillate, the base rounded or broadly cuneate, the surfaces uniformly green, only the midnerve evident.

Flowers.--Solitary in the axils of most shoot leaves, with ascending, clavate, short pedicels slightly longer than subtending petioles, bearing at apex just below the flower 1-2 lanceolate-acute, scale-like bracteoles ca. 1 mm long; calyx tube cylindro-clavate, at anthesis ca. 4 mm long, the 5-6 lobes triangular, ca. 1 mm long, alternating at rim with 5-6 triangular-subulate appendages nearly as long, the tube surface greenish, tinged with maroon, the midnerve of the calyx lobes decurrent as narrow ribs; petals distinct, equalling sepals, bright lavender, obovate, ca. 5 mm long, broadly rounded or slightly retuse, entire, cuneate; stamens equal to or more than the sepals, arising at different levels in the calyx tube, the slender, deep lavender filaments thrusting the ellipsoidal dorsifixed anthers beyond the calyx mouth; ovary superior, oblong, ca. 3 mm long, the style terminal, erect, terminating in a capitate stigma at about the mouth of the calyx.

Fruit.--Capsule ca. 3-4 mm long, ellipsoidal-cylindrical, smooth, pale brown, bilocular, the seeds numerous, reticulate.

Distribution and Flowering Season

Margins of ponds, ditchbanks, edges of cypress swamps, southern peninsular Florida; flowering all year.

Special Identifying Features

L. flagellare is the only lythrum of the southeastern area to have an almost exclusively creeping-stoloniferous habit. Leaf length/width ratios are lower than in any other southeastern species.

#### Habitat and Management Implications

L. flagellare is confined to mucky or sandy-peat-muck soils, thus is a plant of high hydroperiod systems. Its best habitat is in the intermittently inundated margins of shallow pineland sloughs or at edges of cypress domes. These types in south Florida may be seasonally dry but over most of the normal year are distinctly wet. The pine flatwoods are usually slash pine, with an understory of saw palmetto interspersed with Myrica, Ilex and ericaceous shrubs, all growing not far above underlying calcareous rock. During the dry periods these areas frequently burn, this promoting a savanna formation composed of grass-sedge with other monocots such as Eriocaulon, Xyris, Juncus, Sagittaria and dicots in general Utricularia, Sabatia, Polygala, Lippia, Hydrocotyle, Ludwigia, Mecardonia, Lindernia, Campanula, Lobelia, Buchnera, Proserpinaca, Rhexia, with wetland representatives of Liatris, Coreopsis, Carphephorus, Bigelowia. Most collections of L. flagellare come from the flatwoods and cypress dome borders of a zone along the Florida gulf coast from Sarasota southward, and much of this same region was ranch country between the major towns (i.e. Sarasota to Punta Gorda, Punta Gorda to Ft. Myers and south) where the flatwoods savannas continued to be burned as they were historically. In more recent years these same tracts have been drained increasingly, this resulting in a reduction of the shallow wetlands habitat supporting the Lythrum. Much former habitat is now uniformly dry except during wettest periods and the plants are now mainly to be looked for only along drainage ditches. L. flagellare, it appears, is another fire-related species of wet savanna and will not persist where woody plants, protected from occasional fire, increase or where the substrate is dried out by construction of drainage ditches.

#### References

- Chapman, A. W. 1897. Flora of the southern states, ed. 3, p. 158. Cambridge, Mass.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 930-931. Chapel Hill, N. C.

SPECIES Lythrum flagellare Shuttlw. lowland lythrum

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: drainage of habitat is detrimental!

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Lythrum flagellare Shuttlw.



MELASTOMATACEAE

Rhexia parviflora Chapm. Small-flowered meadowbeauty

Technical Description

Perennial from short, slender rhizomes.

Stems.--One to few, erect, to 4 dm tall, the lower part somewhat woody, pale brown, 4-angled, at mid-stem definitely angled and with low wings, the stem faces nearly equal, sparsely hairy to smooth save at nodes.

Leaves.--Larger leaves broadly ovate to elliptic, to 3 cm long, on petioles to 0.5 cm long, sparsely appressed-hairy, the apex and base acute, the margin serrulate, the teeth ascending, hair-tipped. Basal leaves usually the broadest, these sometimes nearly round, thence grading gradually upward into narrower, but longer blades, then into bracteal leaves.

Inflorescence.--Flowers in small, symmetrical cymes. Bracts of inflorescence similar to stem leaves, but somewhat smaller, giving it a leafy look.

Flowers.--Mature hypanthium (calyx tube) 5-7 mm long, the body nearly round, the neck short-cylindrical, shorter than the body, with a few hairs toward its tip; sepal lobes ca. 2 mm long, triangular-acuminate, spreading. Petals asymmetrical, suborbicular to broadly obovate, to 1.3 cm long but usually closer to 1 cm long, white, smooth, the mid-vein projecting as a short, slender hair. Stamens projecting beyond the spreading corolla and crowded toward its base, the anthers 3.0-3.5 mm long, linear-oblong, but slightly curved, dehiscent by apical pores.

Fruit.--Capsule smooth, nearly round. Seeds ca. 0.6 mm long, like small snailshells, crested with irregular, roughly concentric, interrupted lines of laterally flattened, dome-shaped processes.

Distribution and Flowering Season

In clearings or light shade, low places, in Franklin (perhaps also Liberty) County, Florida. Flowering from July through September.

Special Identifying Features

This species most closely resembles R. mariana, particularly the white-petaled forms, but has shorter rhizomes, smoother stems, broader leaves. Also, its stem faces are subequal, while those of R. mariana have one pair of stem faces narrower and concave in contrast to the convex and broader other pair. Its anthers are the shortest of its complex, thus in this regard border in character on those of R. petiolata, R. nuttallii, two dwarf, pink-petaled Coastal Plain species.

Habitats and Management Implication

R. parviflora is on wet, high peat content sands, usually on the edges of Hypericum-Ilex-tupelo-pond cypress ponds or on the edge of ti-ti swamps.

Usually it is a part of grass-sedge communities and is probably maintained through removal of shrub and tree competition through periodic naturally occurring fire. Its habitats are sporadic in a prevalently slash or long-leaf pine-saw palmetto-gallberry type. Selective logging in its area probably affects it little, or may even produce additional habitat. On the other hand, site preparation involving digging of drainage ditches or this in combination with bulldozing or other removal of the woody plant and herbaceous ground cover together with the top soil would eliminate this species. It is uncommon even within its known range and care should be taken to preserve its habitat intact.

#### Suggested Reading

James, C. W.

1956. 8:201-230. A revision of Rhexia (Melastomataceae). Brittonia

Kral, R., and P. E. Bostick.

(6):387-440. The genus Rhexia (Melastomataceae). Sida 3

Note--In 1981 I discovered a population of R. parviflora in Geneva County Alabama (see revised map).

Revised March 1980



SPECIES: #145 *Rhexia parviflora* Chapm. small-flowered meadowbeauty

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X	X	X			X	
Damage								
No lasting effect								
Beneficial if done properly	X				X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980

Rhexia parviflora Chapman



MELASTOMACEAE

Rhexia salicifolia Kral & Bostick

Technical Description

Low, stiff, often bushy, tuberiferous and non-stoloniferous, glandular-hirsute perennial.

Stems.--toward primary base subwoody and terete with thin, longitudinally flaking, cinnamon or tan bark, medially and distally 4-angled; narrowly 4-winged, with faces of shoot subequal.

Leaves.--Opposite, decussate, spreading-ascending, subsessile with blades twisted to the vertical, narrowly elliptic, oblanceolate or linear, 1.5-4.0 cm long, 1.0-15.0 mm wide, apically acute with a gland-tipped trichome, the margins with distant, low ascending denticles these tipped with glandular hairs, triplennerv with the lateral nerves often faint and extending little more than half the length of the blade or, in narrow leaves absent, the upper and lower surfaces yellow-green sparsely to copiously glandular-hirsute.

Inflorescence.--A densely to sparsely flowered bracteate regular cyme, the pedicels short, stiff.

Flower and Fruit.--Mature hypanthium urceolate, short-necked, (4.0-) 5.0-7.0 (-8.0) mm long, 3.5-5.0 mm broad, the neck shorter than the globose body, greenish-maroon with a scattering of glandular hairs. Calyx lobes narrowly triangular, 1.5-2.0 mm long, spreading to ascending. Petals 4, broadly obovate or suborbicular, 11.0-12.0 mm long, 7.0-9.0 mm broad, deep lavender-rose, smooth above, glandular hairy beneath at least in the bud. Anthers 4.0-5.0 mm long, appendage 0.25 mm long. Ovary inferior, 4-locular. Capsule subglobose or broadly ovoid, 4-5 mm long, 3.5-4.5 mm wide, with short, glandular hairs at summit around style base.

Seeds.--Cochleate, 0.7-0.75 mm long, 0.5-0.55 mm broad, 0.3-0.35 mm thick with 3-5 prominent, broad, symmetrical or vermiculate longitudinal ridges or contiguous domelike tubercles in lines, these most prominent on the crest.

Distribution and Flowering Season

Sandy shores of limesink lakes and interdunal swales along seacoast, northwestern Florida and contiguous Alabama; flowering from June to frost.

Special Identifying Features

R. salicifolia most resembles R. mariana var. mariana is often associated with it but the latter produces no tubers, perennating instead by rhizomes, has longer-necked hypanthia with slightly larger, white or lavender (rather than rose) petals, unequal (rather than equal) stem faces, and a different seed sculpture. R. cubensis, a tuberiferous meadow-beauty of lower Coastal Plain terraces also looks like R. salicifolia and has petals colored the same, but is usually more robust, flowers twice as big, unequal stem faces, much larger and longer hypanthia, and again a different seed sculpture. No other Rhexia have leaves twisted to the vertical



as does R. salicifolia, in this respect behaving much as does turkey oak.

#### Habitat and Management Implications

R. salicifolia is a plant of full sun and moist sandy or sandy-peaty substrate and its ideal sites are shores of limesink ponds, particularly when these are at low stages. It may also be found around similar ponds that appear amongst dunes along the gulf coast. Associated herbaceous species are largely grass-sedge, these mostly being Panicum, Sacciolepis, Paspalum, Rhynchospora, Psilocarya, Scirpus, Eleocharis, Fimbristylis, Scleria, usually low species in these genera. Other common herbaceous associates are Echinodorus parvulus, Sagittaria isoetiformis, many Xyris, Eriocaulon, Lachnocaulon, Syngonanthus, various Polygonum, Ludwigia, Hydrocotyle, Centella, etc. Several species of Hypericum including the rare H. lissophloeus Adams are often present. Pond cypress, tupelos, willows may be variously developed in these same areas but the rhexias are normally not in such shade, nor do they persist when herbaceous shoreline vegetation becomes too thick.

The commonest forest type around the ponds is longleaf pine-deciduous scrub oak, or pine-evergreen scrub oak toward the coast. In any case most of the larger pine have long since been removed. The primary threat to Rhexia salicifolia comes from the increasing vacation-residential, recreational use of the lakes and ponds which with their limpid clean waters and hilly settings are too much of a temptation to land developers. Also, with the tendency now toward clearcutting the pine and removing the scrub oaks to replace, after mechanical site preparation, with rows of plantation pine, there have been problems with erosion and disturbance of higher shorelines. Some ponds in state or national forest land have had their shoreline mown in an effort to provide more ready access to the water by swimmers and fishermen. Frequent mowing during summer and early fall prevents maturation of new seed.

#### References

- Kral, R. & P. E. Bostick. 1969. The genus Rhexia (Melastomataceae). Sida 3 (6): 387-440.

SPECIES Rhexia salicifolia Kral & Bostick

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		x	x	x			x	
Damage	x							x
No Lasting Effect								
Beneficial if Done Properly					x	x		

Other Comments: This is a wetlands species, thus site drainage destroys it.

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rhexia salicifolia Kral & Bostick





ONAGRACEAE

Oenothera pilosella Raf. ssp. sessilis (Pennell) Straley

Oe. sessilis (Pennell) Munz

Status: Endangered

Technical Description:

Perennial from a short, stout rootstock, the roots diffuse-fibrous, slender, the shoots bolting from an overwintering rosette.

Stems: erect or ascending, mostly unbranched or branching only above the middle, 3-7 dm long, 3-4 mm thick, terete, nearly smooth and tannish proximally, shortly above base becoming pubescent with incurved or appressed whitish pilosulous hairs less than 1 mm long, more densely hairy upward toward and into inflorescence, there becoming tomentose.

Leaves: alternate, those of the rosette smaller than mid-cauline ones, mostly oblanceolate, entire to distantly low-dentate; lowermost stem leaves mostly lacking by full flowering time, if present oblanceolate or spatulate, somewhat smaller than and grading into mid or upper cauline ones which are linear-elliptic to lanceolate, 6-10 cm long, ascending, acute, entire to distantly low-toothed, denticulate, the base narrowly acute to attenuate, decurrent to leaf base or to a short petiole, the surfaces pale yellow-green, tomentose with appressed white hairs less than 1 mm long; stem leaves gradually diminishing in size upward into the inflorescence.

Inflorescence: flowers stipitate, axillary to bracteal leaves in an indeterminate terminal spike, this solitary or compound by several ascending, elongating branches.

Flowers: bisexual, the calyx irregular, the corolla regular, strongly ascending, showy, mostly 6-7 cm long from base of ovary to petal apex, 4-5 cm across the petals; sepal lobes in bud narrowly lance-ovoid, ca. 2 cm long, the narrowly linear sepal tips erect and parallel, ca. 2 mm long; perianth tube from ovary summit to base of sepal limb narrowly tubular, ca. 2 cm long, grayish-pink, appressed-white-pilosulous, the calyx limb of 4 fused sepal lobes ligulate, ovate or broadly lanceolate, tipped with the 4 linear teeth, appressed-pilosulous externally; corolla with distinct petals 4, pale yellow, spreading, broadly obtriangular, ca. 3 cm long, nearly as broad at slightly emarginate apex; stamens 8, the slender, smooth, pale yellow filaments arising at orifice of perianth tube, 5-10 mm long, the anthers linear-oblong, dorsifixed, deeper yellow, ca. 5 mm long; ovary inferior, clavate (shape of ovary as covered by perianth tube), 1.0-1.5 cm long at anthesis, 4-angled, pilosulous, the erect style slender, 3.0-3.5 cm long, smooth, the 4 stigmatose branches narrowly linear, spreading, 3.5-4.0 mm long.

Fruit: Capsule narrowly ellipsoidal, ca. 1 cm long, 3-4 mm thick, 4-angled, pilosulous, the stipe 1-2 mm long; seeds not seen.

Distribution and Flowering Season:

Sandy silts, sandy-silty clay loams, fine sandy loams, Mississippi Embayment of northern Louisiana, eastern Arkansas, with an outlier

in the Gulf Coastal Plain of Texas (Galveston Co.); flowering in May, June.

#### Special Identifying Features:

Oe. pilosella sessilis is in sect. Kneiffia of the genus. In this section only two other species, O. fruticosa, O. perennis, are truly perennial. O. perennis is distinguishable on the basis of its smaller petals (5-10 mm long) and its nodding inflorescence; O. fruticosa (and subspecies) has clavate to oblong fruit, the sepal tips are shorter (ca. 1 mm long or less). In O. pilosella the capsules which are narrowly clavate to elliptic, and the linear sepal tips are longer. O. pilosella sessilis is distinguished from O. pilosella pilosella by its shorter, more copious pubescence, its shorter ovary, its sepal tips which are erect and closely parallel (rather than spreading).

#### Habitat and Management Implication:

O. pilosella sessilis appears to be extirpated over much of its former range. Straley, the last monographer of sect. Kneiffia (1977) opines that it is probably now found only in the delta of Arkansas. No collections of it have been made in Texas for more than 150 years! Thus, my statements about habitat related only to where I have seen it in Arkansas.

The habitat appears to have been originally one of low rises in Mississippi delta prairie. Sometimes these are referred to as "rice prairie"; indeed much of this land has been converted to rice culture. The original forest was mostly mixed bottomland hardwoods, the wettest typically cypress-tupelo-swamp privet, the less flooded populated by stands of Nuttall Oak, Willow Oak, Overcup Oak, Sugarberry, Swamp Red Maple, Swamp Ash, Water Hickory, etc., with some higher rises producing mixed upland hardwoods. Much of the higher terrace land was once savanna prairie, kept from being dominated by trees primarily by fire. The dominant vegetation was Big and Little Bluestem, Panicum virgatum, Sorghastrum nutans, Tripsacum, Manisuris, etc., a great variety of carices, Juncus, Sisyrinchium, Tradescantia, Rhexia, Polytaenia, Eryngium, Lysimachia, various Phlox, Physostegia angustifolia, Penstemon digitalis, P. tubaeformis, Amsonia illustris, and many showy compositae in Liatris, Silphium, Helianthus, Echinacea, etc.

What remains of the Oenothera appears to be confined to small areas of original prairie in railroad and highway rights of way. Here the plants appear in very small patches, are rooted in dark prairie earths of what must have been parts of low rises, thus rarely if ever flooded. Such sites, if left undisturbed and protected from fire, would probably be closed by invading woody plants, first shrubs such as Styrax, Cornus, Salix, later by mixed hardwoods, particularly oaks, ash, hickory, elm. Risks to this Evening Primrose are obvious; an increasing acreage is now, because of the richness of the soil, devoted to row crops of corn, cotton, soybeans, as well as rice. Aggravating the problem is the tendency for large areas of railroad right of way, a last refuge, to be given over to cultivation, thus these bits of natural prairie land vanishing forever.

References:

- Gleason, H.A. 1963. The new Britton & Brown illustrated flora of the northeastern United States and adjacent Canada, New York.
- Munz, P.A. 1965. Onagraceae. N. Am. Fl. ser. 2, 5: 1-278.
- Pennell, F.W. 1919. A brief conspectus of the species of Kneiffia with the characterization of a new allied genus, Bull. Torr. Bot. Club 46: 363-373.
- Straley, G.B. 1977. Systematics of Oenothera sect. Kneiffia (Onagraceae). Ann. Mo. Bot. Gard. 64: 381-424.



SPECIES: Oenothera pilosella Rar. ssp. sessilis (Pennell) Straley

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage		NA	NA	NA				X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Known Distribution of:

Oenothera pilosella Raf. ssp. Sessilis (Pennell) Straley



HALORAGACEAE

Myriophyllum laxum Shuttlw. ex. Chapm. Piedmont water-  
milfoil; water-milfoil

Technical Description

Perennial aquatics from submersed, creeping and rooting bases.

Stems.--The leafy shoots very elongate, slender, terete, smooth, greenish with tints of red.

Leaves.--The submersed leaves mostly in whorls of 3 or 4, spreading, 2-3 cm long pinnately divided into spreading, hairlike segments, green or with tints of red; emergent parts of stems terminal, erect. The emergent leaves abruptly shorter, (at most to 5 mm. long), more shallowly pinnate with broader segments or even entire, oblanceolate.

Inflorescence.--Flowers unisexual or bisexual, where unisexual, with the male borne above, small, greenish or with some reddish tints, sessile in the whorls of emersed leaves, the inflorescence an evenly interrupted, slender spike.

Flowers.--Sepals and petals each 4, small, scale-like, the sepals about 0.5 mm long, the petals about 1 mm long. Stamens projecting beyond the perianth, 4-8, the filaments very slender, the anthers linear, yellowish green, about 1.5 mm long. Ovary inferior, the 4, short-oblong, united carpels with recurved styles and stigmas.

Fruit.--Ripe fruit separating into 4, 1-seeded, segments, the segment backs low-warty.

Distribution and Flowering Season

Ponds and ditches, Coastal Plain, eastern North Carolina southward through South Carolina, Georgia, northern Florida and west into northwestern Florida and southern Alabama. Flowering from April through August.

Habitats and Management Implication

These plants, while considered rare, may be locally abundant in clear water of ditches and shallow ponds. In that they may be in situations that may be dry one year, filled with water another, they are abundant only during wetter periods. The ecology of most aquatic groups such as this is poorly understood. Naturally, in areas where drainage of forest has lowered the water table and rendered standing water less available, such species as M. laxum become more rare. On the other hand they may also increase in areas where water is artificially impounded. Some myriophyllums such as M. brasiliense, M. heterophyllum, M. spicatum are frequently dominant aquatics in such impoundments. Such, however, does not seem to be the case with this species.

References

- Radford, A. E. et al. 1968. Manual of the vascular flora of the Carolinas, p. 758. Chapel Hill, N.C.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 954-955. Chapel Hill, N.C.



SPECIES: #80 Myriophyllum laxum Shuttlw. ex. Chapm. Water-milfoil

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage								
No Lasting Effect				NA				
Beneficial if Done Properly								

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Myriophyllum laxum Shuttlw. ex Chapm.



APIACEAE

Eryngium cuneifolium Small. Wedge-leaved button snake  
roots; eryngos or button-snake roots

Technical Description

An erect smoothish perennial herb to 1/2 meter tall, the foliage aromatic, from a woody, elongate, stoutish rootstock.

Stems.--One to several, spreading ascending or erect, round in cross section but with several distinct longitudinal ribs.

Leaves.--Basal leaves in strong tufts, long-stalked, the blades wedge-shaped, ca. 4 cm long, divided above into 3-5 apical, thick-margined, bristle-tipped teeth. Stem leaves numerous, spreading-ascending, also with bristle-tipped teeth, gradually lessening in size to the flower clusters.

Inflorescence.--Flowers in bristly-looking heads, these mostly greenish-white, later tinged with pale blue, each head about 0.7-1.0 cm broad, on a stalk about as long or longer, in open, cymose clusters, and each with an involucre of spreading, usually 3-segmented, bristle-tipped bracts, these spreading and thus involucre broader than heads, greenish, or greenish-white. Surface of receptacle of head elevated, flowers many, each with a 3-segmented, greenish white, sharp-tipped bract.

Flowers.--Sepals 5, linear, about 2 mm long, erect, thick-margined, sharp-tipped, pale blue with tints of green and white; petals 5, erect, narrow, pale blue with tints of white, about as long as the sepals; stamens 5, anthers yellowish-white; ovary inferior, with a pebbly or warty surface, broadly obovate or round, about 1.5 mm long in fruit.

Distribution and Flowering Season

This species occurs naturally in the few counties of the southern Central Highlands of peninsular Florida, in what is called the lake region. It is locally abundant on the deep, fine-textured white sands of the scrub-forested sandhills of that region, and blooms from July to January.

Habitats and Management Implications

The area is largely forested with sand-pine and evergreen scrub oak, mixed with shrubby members of the holly family, the heath family (particularly Lyonia), and palmetto species, various Polygonella. In areas where the scrub and overstory pine is cut away, such species as this Eryngium will spread. They also increase after heavy burns have cut the overstory and understory competition, probably because of the durable, large, subterranean rootstocks. Reproduction by seed is heavy. Mechanical disturbance of the sort brought about by heavy logging, even scraping away of surface shrubby vegetation, provides sandy clearings that promote such species. Heavy development of overstory pine tends to reduce it.

The greatest hazard the species probably faces at present is land development for housing. The plant itself is not high priority grazing, its major damage from cattle would be from trampling.



References

Small, J.K. 1933. Manual of the Southeastern Flora: p 964, Chapel Hill.N.C.

Mathias, Mildred E. and Constance, L. 1941. American Midland Naturalist  
25: pp. 361-387.

SPECIES: #111 Eryngium cuneifolium Small. Eryngos or button-snake roots

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage		X	NA					
No Lasting Effect								?
Beneficial if Done Properly	(NA) X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Eryngium cuneifolium Small





Oxypolis canbyi (Coult. & Rose) Fern.O. filiformis (Walt.) Britt. var. canbyi Coult. & Rose

Status: Endangered

## Technical Description:

Perennial, smooth, aromatic (smelling faintly of dill), strongly clonalizing umbellifer, increasing by numerous fleshy, elongate, pale, stoloniferous rhizomes.

Stems: erect or ascending, slender but stiffish, terete, finely fluted, arising from scaly buds at tips of previous year's rhizomes, fistulose, to 1.5 meters tall, the decumbent base frequently rooting at nodes, the nodes there approximate, the internodes mostly 5-10 mm thick toward plant base, gradually tapering and more elongate upward into inflorescence, usually branching only well above mid-stem, the branches arching-ascending, forking or ternately rebranching, forming a candelabralike narrow to broad compound of several to many umbels, the surface a pale green, toward stem base purplish or pinkish.

Leaves: alternate, phyllodial, terete, nodose-septate, the lower ones longest, frequently to 2 or 3 dm long or more, narrowed abruptly from the broadly clasping base, then gradually tapering to the conical, acute apex, upwardly gradually diminishing in length into the inflorescence, there overtopped by umbels in anthesis, the surface finely fluted as in stems, dull green.

Inflorescence: an indeterminate compound of compound umbels, the primary peduncles axillary, elongate, arching-ascending or erect, stiffish, terete, mostly 5-10 cm long, the secondary peduncles (primary rays) 7-12, slender but stiffish, mostly 2-3 cm long, subtended by a whorl (involucre) of several, spreading, apically upcurved, linear-setaceous, green bracts 1.0-2.5 cm long, these usually grooved on the upper side; secondary umbels mostly ca. 1 cm high, to 1.5 cm broad, the slender, stiff pedicels numerous, 2-7 mm long, subtended by an involucre of green, linear-subulate bractlets 3-10 mm long; inner florets of some umbels strictly male, some outer florets strictly female.

Flowers: bisexual and/or unisexual, regular; sepals 5, narrowly triangular-subulate, pale green or tinged with red or pink, spreading, mostly ca. 0.5 mm long, articulated to hypanthial rim and rarely persisting on ripe fruit; petals 5, white, ca. 1.2-1.3 mm long, short-clawed, the broadly ovate-orbicular blade strongly incurved with the back concave, the narrow apex curved inward, nearly touching the strongly raised mid-nerve; stamens 5, alternating with petals on hypanthial rim, the filaments white, linear-subulate, terete, to 1.5 mm long, apically incurled so that, while anther is basifixed, the dorsal side of the connective lies against the filament apex, the anthers nearly round, ca. 0.5 mm long, pale yellowish-white or tinged with pink, bilocular; ovary inferior, bicarpellate, the hypanthium at anthesis ca. 0.5-0.6 mm high, in outline narrowly campanulate, somewhat compressed laterally and indented along the edges of the commissure, longitudinally low-ribbed, green tinged with pink, the stylopodium (enlarged

nectariferous style bases) fleshy, yellowish, conical, ca. 0.5 mm high, the short, fleshy style branches excurvate at anthesis, the stigmas slightly capitate.

Fruit: Schizocarp broadly obovate or ellipsoidal in outline, strongly compressed dorsiventrally, mostly 4-6 mm long, the apex strongly notched, the fruit often bowed inward through unequal and greater development of the outer mericarp, the outer face of each mericarp with 3 evident but narrow longitudinal ridges over the low-convex, elliptical seed cavity and with slender, longitudinally oriented, reddish, oil tubes in the broad intervals, also marginally thickened so as to make the border of the mericarp much thicker than the seed cavity (see plate!); medial surface over seed cavity often sparsely but evidently muricate.

#### Distribution and Flowering Time:

Borders and shallows of cypress-Pond Pine ponds, sloughs, shallow savanna ponds and ditches, infrequent, Coastal Plain, Delaware (where probably extirpated), South Carolina, Georgia; flowering from late May through July.

#### Special Identifying Features:

O. canbyi has been placed by some as a variety of O. filiformis (Walt.) Britt., a more widespread, superficially similar, species of the Atlantic and Gulf Coastal Plain, but this is probably because both species are often collected without getting the rootstock or the mature fruit. The former is at once distinguished by its strongly clonalizing habit, in that it develops strong, spreading, fleshy rhizomes; O. filiformis produces no rhizome whatever. O. canbyi has much more slender, whiplike, elongated lower leaves, while those of O. filiformis are stiffer, often stouter, tend to have a stronger taper, are more fleshy. O. canbyi has a totally different looking fruit in that the edges of each mericarp are strongly distended under the prominent ribs by thickenings of corky material so that the margins of each schizocarp are actually thicker than is the central area over the seed; on the other hand the fruit of O. filiformis are thicker medially than marginally. In that there are such strong differences it would be far more consistent with the taxonomy of the genus to consider the two taxa as distinct species.

#### Habitat and Management Implication:

I have seen several populations in Georgia and the habitat is fairly consistent, namely shallow ponds in pinelands or shallow, grassy-sedgey sloughs. Such are usually peat-muck-bottomed, rimmed with growth of Pond Cypress, Pond Pine, Swamp Black Gum, Ogeche Plum, with some undergrowth of Stillingia aquatica, Cephalanthus, Crataegus, Ilex myrtifolia, Itea, Sambucus, Smilax, Rosa, etc. Grasses and sedges such as Panicum hemitomon, Manisuris, Rhynchospora inundata, R. macrostachya, R. perplexa, R. microcarpa, R. tracyi, Blecharis (several species) dominate, are interspersed with Eriocaulon compressum, several Xyris, Polygala cymosa, Hypericum denticulatum, Proserpinaca, Rhexia virginica, R. aristosa, various Ludwigia, Asclepias lanceolata, Hydrocotyle, Bacopa caroliniana (with its odd turpentine stink!), various Sabatia, and many

composites, some of the more consistent being Pluchea rosea, Sclerolepis, Coreopsis nudata. Shrubby Hypericum such as H. fasciculatum, H. myrtifolium may sometimes form large patches.

All such plants are the sort that thrive on peat-muck substrates that usually are at least wet, but which may, during dry cycles be exposed for brief periods. During such dry periods the former shallows may burn, this doubtless maintaining or increasing grass-sedge formations.

Several stations for O. canbyi have been lost in recent years. In many instances the shallow pineland ponds have been drained and converted to lowland pasture, with even the few moist areas remaining becoming dominated by pasture grasses. In other cases the ponds have been converted to stock tanks as well as reservoirs for irrigation water and under such management, which involves deepening by dredging as well as ditching, the Oxypolis is lost. In still other cases the drainage is done so as to provide drier sites either for cropland or for pine plantation, in either event resulting in total destruction of the habitat.

#### References:

Coulter, J.M. & J. N. Rose. 1900. Monograph of the North American Umbelliferae. Contribs. U.S. Nat. Herb. 7 (1): 1-256.

Fernald, M.L. 1939. Oxypolis canbyi (Coulter & Rose) comb. nov. in Rhodora 41 (484): 139.

\_\_\_\_\_. 1950. Gray's manual of botany, ed. 8, pp. 11-2-1103.



SPECIES: Oxyopolis canbyi (Coult. & Rose) Fernald

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X	X	X			X	
Damage						X		X
No Lasting Effect								
Beneficial if Done Properly	X				X			

Other Comments: Drainage of site is fatal to this species!

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Oxypolis canbyi (C. & R.) Fern.



APIACEAE

Oxypolis greenmanii Mathais & Constance. Giant water cowbane

Technical Description

Tall (to 3 meters), smooth, perennial herb from a cluster of tuberous or thickish roots.

Stems: Usually single, rigidly erect, tubular, often 1.5 cm thick, usually sparingly branched.

Leaves: Lowest leaves linear-tubular, often to 5 dm long, strongly cross-walled as in some rushes, tapering gradually to narrowly conical tips.

Leaves gradually shortening, widely scattered on the stem as the flower clusters are approached.

Inflorescence: Flowers greenish-yellow or maroon-tinted, about 3 mm broad, in terminal compound umbels up to 1 dm broad. Involucre of greenish, linear bracts mostly shorter than the flower stalks.

Flowers: Sepals very small, triangular, spreading. Petals greenish or maroon-tinted, broad, incurved.

Fruits: Strongly flattened, with broad, pale wings, about 7 mm long.

Distribution and Flowering Season

O. greenmanii is confined to a few counties of northwestern Florida in the Apalachicola River watershed, and blooms during July and August.

Special Identifying Features

This species is quite distinctive, with its very rush-like appearance. Its nearest relative, O. filiformis, has whitish flowers and is a lower plant.

Habitats and Management Implication

It is a species of high hydroperiod soils, is very often rooted in sandy peat or peat-muck of margins of cypress-pond pine-Nyssa "ponds" or in shallow water of the ponds themselves or ditches or watercourses. Its commonest shrubby associates are various species of Hypericum, Stillingia aquatica.

The forest type surrounding such hypericum ponds is usually a mixture of slash pine and longleaf pine with palmetto-gallberry understory, with interspersions of ti-ti. The underlying substratum is often a deep, black, sandy peat muck.

Logging of the pines and cypress of the areas this frequents would tend to increase the species. Succession to a swamp-hardwood overstory would shade it out it is definitely a plant of clearings in wetlands. Site preparation involving drainage would eliminate the species.



#### References

- Mathias, M.E. and L. Constance 1942. New North American Umbelliferae.  
Bull. Torr. Bot. Club. 69: 151-155.

Revised March 1980

SPECIES: #112 Oxypolis greenmanii Mathais & Constance; Giant water cowbane

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		NA	X	X			NA	
Damage								
No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments: No draining - a true swamp plant

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Oxypolis greenmanii Mathias & Constance





APIACEAE

Ptilimnium nodosum (Rose) Mathias. N.C.N.  
Harperella nodosa Rose  
H. fluviatilis Rose  
H. vivipara Rose  
Ptilimnium viviparum (Rose) Mathias  
P. fluviatile (Rose) Mathias

Technical Description

Mostly annual, sometimes producing rosettes from buds off lower nodes, the roots shallow, diffuse-fibrous, the plants with a faint scent of dill.

Stems.--Erect from short-decumbent base, fistulose, from 1 to 12 dm high (size dependent on site and spacing of plants), stiffish or weak, solitary or tufted, the lower nodes numerous, often rooting, the erect portion toward base mostly 3-5 mm thick, subterete, multicostate, purplish-tinged, upwardly becoming strongly angulately ribbed and green, toward base usually unbranched, from mid-stem up strict to near apex or alternately (rarely oppositely) branching, with branches arching-ascending to nearly erect.

Leaves.--Phyllodial (actually compound but reduced to a mere rachis), tubular, lineal with broadly clasping bases, the rosette and lower ones often 3-4 dm long, variable in width, some slenderly linear, some broader, fleshier, 3-5 mm thick, in any case cross-septate at regular intervals, sometimes constricted at septations in thicker leaves; phyllodia becoming shorter, more distant upward on stem, grading gradually to short-linear bracteal leaves.

Inflorescence.--A compound of compound umbels, on the stricter plants these rather few and close together at tips of essentially axillary peduncles, these mostly erect, up to 1 dm long, mostly shorter; primary rays 5-15, stiffly erect or spreading, 5-20 mm long, subtended by an involucre of short, spreading, subulate or lance-subulate bracts rarely longer than 0.5 mm, the secondary rays (pedicels) mostly 5-15, 1-5 mm long, subtended by a weak involucre, these bracts mostly under 0.5 mm long.

Flowers.--Bisexual or unisexual, regular, each small umbel containing both perfect and male florets the male usually toward center and shorter-pedicelled; hypanthium of bisexual florets at anthesis ca. 0.5 mm high, broadly campanulate, indented along the commissure, the round-backed sides longitudinally ribbed; calyx lobes 5, narrowly triangular-subulate, green or tinged with rose, ca. 0.5 mm long, spreading, sometimes incurved-tipped, persisting on fruit; petals white, short-clawed, the blades somewhat fleshy, suborbicular, strongly incurved, apically short-acuminate, the mid-nerve somewhat raised above; stamens 5, the spreading to incurved, white, tapering filaments 0.5-1.0 mm long, the ellipsoidal-oblong bilocular anthers yellowish to reddish, dorsifixed, introrse, to 0.5 mm long; ovary inferior, contained in perianth tube, crested by a bilobed, low-conic yellowish to pale pink stylopodium 0.2 mm high, the style branches slenderly linear, spreading, 0.3-0.4 mm long.

Fruit.--Schizocarp broadly elliptical in outline, 1.5-2.0 mm long, slightly compressed laterally (broad plane of fruit perpendicular to commissural plane), thus fruit broadly oblong in cross section; mericarps in cross-section semicircular, along the commissural border with an elevated, spongy-thickened band, the rounded backs with

3 strong, green or tan longitudinal ribs, the intervals broader, thin over the seed and with solitary oil tubes, dark-reddish-brown; commissural face of mericarp flat or slightly concave, except for the pale spongy border a dark green or reddish-brown, the oil tubes double.

#### Distribution and Flowering Season:

Wet bars, shoals and seepy banks of rocky, fast-flowing streams, wet savanna, shallow pineland pools, ditches and ditchbanks, very local, inner and outer Coastal Plain, Piedmont, and locally in a few isolated Appalachian localities. Flowering mostly from May into July, intermittently to the end of the growing season.

#### Special Identifying Features:

In that populations of quill-leaved Ptilimnium fluviatile (Rose) Mathias show overlapping variation in all characters with equally variable populations of P. nodosum, and because many of these characters may vary because of external environment, (i.e. pond versus riverine habitat, substratum character, spacing of plants, amount and character of competing vegetation) and also because none of the characters supposed to distinguish the species have much geographical basis, it is suggested that the oldest available name be used for a complex formerly thought to contain three species (P. nodosum, P. fluviatile, P. viviparum (Rose) Mathias). That name is P. nodosum.

#### Habitat and Management Implications

The few existing localities known for P. nodosum in the Coastal Plain appear to be shallow pineland ponds and low savanna meadow. The type locality of the species, a shallow pond near Ellaville, Schley Co., Georgia, no longer exists, and other habitat in the area of Unadilla in Dooly Co., Georgia appears also to have been destroyed. In Aiken Co., South Carolina, two localities are still known; one an area of grassy savanna near Montmorenci is nearly destroyed and the other, a shallow pond (doline) near Monetta, while disturbed, is still in good condition. The central habitat seems to be what is called by the local people "high pond". Such high ponds are shallow, ringed by willow oaks, swamp black gum, sweet gum, pond cypress, and sometimes pond pine. The soil of the pond edges and bottom is typically a peat-muck, this overlying fine black sand or sandy-silty-clay, which in turn overlies solution rock. Such ponds have unpredictable shorelines, with water sometimes extending into the bordering forest, at others retreating to the center of the ponds or altogether disappearing. The dominant grass is Panicum hemitomon, with an interspersions of other panicums, cut-grass, Sacciolepis, and sedges such as Rhynchospora perplexa, R. microcarpa, R. tracyi, R. inundata, R. macrostachya, etc., Carex walteri, C. lupulina, Eleocharis tricostrata, E. melanocarpa, E. microcarpa, E. baldwinii, Psilocarya, Dichromena

colorata, Fimbristylis, admixed with Xyris iupicai, X. smalliana, X. fimbriata, Eriocaulon, Juncus, Sagittaria; dicots often include Hypericum fasciculatum, H. denticulatum, H. myrtifolium, Rhexia virginica, R. mariana, R. aristosa, Proserpinaca pectinata, various Ludwigia such as L. spathulata, L. pilosa, L. sphaerocarpa, L. linearis, Centella, Hydrocotyle, Lindernia, Bacopa caroliniana, Sabatia, Lobelia, Polygonum species. Composites may include Coreopsis nudata (in Georgia), C. rosea (in South Carolina), Rudbeckia mohrii, R. nitida (in Georgia). Sclerolepis is nearly always present and is abundant.

In the riverine sites of Alabama, upland North Carolina, Maryland, Kentucky and West Virginia it is either in or on the immediate banks of swift flowing, clear and rocky streams. In early spring its rosettes are reminiscent of those of some Juncus. The substrate reaction is acidic, its associate species are often the same genera of herbs as found with it in the Coastal Plain. In some of the Alabama localities, particularly along the Little River, it may be abundant locally and may form nearly pure stands. It is never found in heavy shade, but the streams in whose shallows it grows all flow through mixed mesophytic or oak-hickory-pine forest. It is always found in wet soil situations thus it is not surprising that it thrives in spite of periodic flooding so long as its substrate is not washed away. Flooding in the sort of healthy streams it frequents, whose watersheds are usually well timbered, is usually of short duration. However heavy logging of the steep slopes and headwater ravine areas would do much to disrupt such short flood cycles and could reduce such populations by extending the amount and duration of flooding. Much of this riverine habitat has been destroyed through dam building. The Coastal Plain sites are, as stated earlier, much reduced. The pineland ponds and wet savanna habitats are everywhere being drained either in the process of preparation for pine plantation or row crop agriculture or "improved" pasture.

#### References

- Easterly, N. W. 1957. A morphological study of Ptilimnium. Brittonia 9: 136-145.
- Kral, R. 1981. Notes on some "quill"-leaved umbellifers. Sida 9 (2): 124-134.
- Mathias, M. E. 1936. Studies in the Umbelliferae V. Brittonia 2 (3): 239-245.
- Radford, A.E.H.E. Ahles & C. R. Bell. 1968. Manual of the vascular flora of the Carolinas. Chapel Hill, N.C.
- Rose, J.N. 1905. Two new umbelliferous plants from the coastal plain of Georgia. Proc. Nat. Mus. 29: 441-442.
- \_\_\_\_\_. 1911. Two new species of Harperella. Contribs. Nat. Herb. 13: 789-790.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 977-978. Chapel Hill, N. C.



SPECIES Ptilimnium nodosum (Rose) Mathias. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	X-*	X	X			X	X
Damage								
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments: \*any site preparative methods involving drainage or soil disturbance would eliminate this species. riverine habitat best protected by careful watershed management, avoidance of pollution

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Ptilimnium nodosum (Rose) Mathias



APIACEAE

Sium floridanum Small. Florida water-parship

Technical Description

Perennial, smooth, tuberiferous and rhizomatous herbs.

Stems.-- Strongly decumbent, the stem bent upward to a height of 3-9 dm from a pale, elongate-rhizomatous base (this often producing fusiform tuberiferous rhizomes later in season) arising from a contracted caudex, the lower nodes rooting, the aerial part of the stem somewhat zig-zag, deep green, sulcate (strongly ribbed and grooved).

Leaves.-- Alternate, rather distant, spreading-ascending, the largest lowest, 1-odd-pinnately compound, mostly 1-2 dm long, the lateral leaflets mostly 2-4 pairs, spreading, elliptic, linear-elliptic, or lanceolate, mostly 4-8 cm long, acute, low-serrate, sometimes falciform, the bases sessile or nearly so, oblique, usually acute, the lowest pair much smaller, the terminal leaflet often largest, broadest, on a stalk 1 cm or more long; upper leaf surface deep green, the lower surface paler; petiole elongate, strongly ribbed, expanding to a broad, scarious-margined, clasping base. Lowermost leaves usually withered by flowering time; leaves grading smaller in size progressively into the inflorescence, where mostly much smaller, simple.

Inflorescence.-- Umbels arising from most upper leaf axils, spreading on primary peduncles of various lengths; the lowermost maturing first; primary rays of umbel subtended by 3-5 reflexed, linear-lanceolate, scarious-edged bracts 1 cm long or less, secondary rays mostly 1-2 cm long, spreading, terminating in involucre of bracts similar to those of primary rays, together with the spreading, stiff but slender pedicels, these mostly 5 mm long or less.

Flowers.-- Slightly irregular, bisexual; sepals 5, reduced to minute tubercles less than 1 mm long; petals 5, distinct, the corolla rotate, white, spreading to a width of 2.5-3.5 mm, the blades ovate, somewhat unequal, the largest 2.5-3.0 mm long, acuminate-incurved, the margin somewhat revolute, at base abruptly narrowed to a very short claw. Stamens 5, the filaments at first arched inward, then at anthesis spreading horizontally, slender, terete, ca. 1 mm long, the broadly ellipsoidal anthers ca. 0.3 mm long, yellowish, basifixed, the connective below forming a short-triangular spur; ovary inferior, 2-carpellate, with 2 distinct, spreading, linear styles.

Fruit.-- A smooth schizocarp, the body broadly oblong-ellipsoidal, ca. 3 mm long, 2 mm wide, sometimes curvate, slightly compressed parallel to inflorescence (dorsiventrally), each mericarp strongly 5-ribbed, stylopodium 2-lobed, the lobes forming a low cone, the styles persistent and spreading-recurved, slender, ca. 1 mm long.

Distribution and Flowering Season

Alluvial woodlands, southwestern Georgia, northwestern Florida and contiguous southeastern Alabama. Flowering in June and July.

Special Identifying Features

S. floridanum is treated by Radford et al. (1968) as a part of S. suave Walt. (S. cicutaefolium Schrank.), and may indeed represent but a radiate



extreme or a variety. Whatever the case, S. suave is a much taller, coarser plant, usually erect rather than decumbent-based. Its leaves are larger, the leaflets more saliently (projecting) toothed, its inflorescence much broader and with broader involucral bracts, its fruits broader, often longer.

#### Habitat and Management Implications

S. floridanum forms local populations on sandy-silt of alluvium of rivers and stream bottoms, usually in full shade. The overstory is a mixture of Salix, Fraxinus pensylvanica and F. caroliniana, Planera, various of the willow oaks, overcup oak, basket oak, shumard oak, cherrybark oak, red maple, sycamore, etc. It is amongst understory shrubs such as Hypericum galioides, Myrica carifera, Cephalanthus, Sebastiania, Amorpha. Herbaceous associates include Elytraria caroliniensis, Justicia ovata, Commelina virginica, Micromeria pilosiuscula, Vernonia gigantea, Pluchea, various Panicum, Sagittaria, Peltandra, Rhynchospora miliacea, etc. Logging of the hardwood overstory would, if involving clearcutting, have an adverse effect in that it would elevate the water table, admit too much light, disturb the sandy alluvium in which the rhizomes are found. Single tree or groups selection would, if mechanical disturbance were kept to a minimum, probably not effect adversely.

#### References

- Radford, A.E., H.E. Ahles and C.R. Bell, 1968. Manual of the vascular flora of the Carolinas, p. 783. Chapel Hill, N.C.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 975-976. Chapel Hill, N.C.

SPECIES Sium floridanum Small. Florida water parsnip

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA		X		see note
Damage								
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: Site drainage harmful! S. suave, a related species, is a suspected stock-poisoner.

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Sium floridanum Small





ERICACEAE

Elliottia racemosa Muhl.

Technical Description

Tall shrub or low tree, forming small thickets from a spreading, shallow rootstock.

Stems.--The trunk is usually erect, rarely reaching 7 m, the diameter to 20 cm. The bark is pale gray, smoothish but vertically cracked. Branches are somewhat ascending, forming a narrowish crown, the 2-year-old twigs are slender, but stiffish, with grayish bark, this vertically cracking, the current season's shoots grayish or pale brown with reddish tones, the lenticels slightly raised, dark, the leaf scars circular or semicircular with one round bundle trace in the middle; lateral buds are small, short-conic, reddish, imbricate, smoothish.

Leaves.--Simple, deciduous, spreading-ascending, folded somewhat peach-like, drooping, spirally arranged, the larger blades 7-10 cm long on reddish petioles approximately 1 cm long, elliptic to oblanceolate, thinnish, the apex acute, sometimes mucronate, the margins entire, usually reddish, slightly rolled inward toward the midrib beneath, the base acute or short-attenuate, the upper surface dark green, smooth, the lower surface pale, finely reticulate, soft-hairy, with a strongly raised midrib.

Flowers.--Spreading in terminal racemes 8-20 cm long, on slender stalks 1.0-1.5 cm long, these subtended by a single linear-acuminate deciduous bract about 4-5 mm long and usually bearing a pair of smaller deciduous, ciliate, often subopposite bracts medially. Perianth regular, the corolla bell-shaped, the separate petals about 1 cm long, linear, white, at first erect, then recurved-tipped. Sepals 4, low-triangular, about 1 mm long, greenish-red, ciliate, spreading. Stamens 8, shorter than the petals, erect, the anthers 1.0-1.3 mm long, oblong, each with a short, narrow tip, opening longitudinally. Style projecting beyond the spreading corolla, narrow, elongate, tipped with a truncate, thickish stigma; ovary 4 (rarely 5)-lobed.

Fruit.--A round or depressed-roundish smooth, capsule slightly less than 1 cm broad when ripe and then splitting along the valves. Seeds agglutinated to the placenta, somewhat laterally compressed, obovoid, ca. 2 mm long. (According to some authors, these plants do not self, therefore pollen must be received from neighboring clones. Frequently the fruit does not produce much seed, or none at all are produced.)

Distribution and Flowering Season

Elliottia, with but one species, is presently known but from a few clones in the sandhills of Georgia's Coastal Plain, mostly in or near the drainage of the Altamaha River. It has been reported from South Carolina, but not recently. It flowers from June to August, with heaviest bloom during July.

#### Habitats and Management Implication

E. racemosa is always found on well-drained, sandy, acidic soils, usually in sandhills and with a forest cover either of longleaf pine-deciduous scrub oak or pine-evergreen scrub (particularly oak.) In no case does it persist where the water table approaches the surface, thus, though it is found sometimes in bottoms near the Altamaha, it is there only on sandy rises. Usually what might appear to be a rather large population is actually one plant because new stems arise from a shallow, wide-spreading root system.

In that the type of forest assemblage which this species associates with is of low potential for lumber, the greatest hazard the species would be faced with would be stand improvement cutting, where few trees of merchantable size or quality would be cut together with the low quality species. Selective cutting, would pose no problems for Elliottia unless the logging operations mechanically damage the plants. Such an event is unfortunately quite possible for this is a shallow-rooted species. Being a thin-barked species it is also highly susceptible to fire damage, though it will readily resprout from the roots. A type of webworm does extensive damage to the foliage and inflorescence. Site preparation, which would involve mechanical alteration of the soil subsequent to clearcutting, would of course eliminate the species, which is a poor setter of seed and therefore unlikely to repopulate through seed from adjacent populations or survivors from amongst the clone affected.

This is such a rare species that all who work within its small existing area are urged to mark the clones and to make every effort toward their preservation.

#### Suggested Reading

Faircloth, W. R. 1970. An occurrence of Elliottia in central south Georgia. *Castanea* 35:58-61.

Harper, R. 1903. Elliottia racemosa again. *Torrey* 3:106.  
1905. Phytogeographical exploration in the Coastal Plain of Georgia in 1903. *Bull. Torr. Bot. Club* 32: 141-171.

Ravenel, H. W. 1976. Some rare southern plants. *Bull. Torr. Bot. Club* 6:81-82.

Small, J. K. 1933. *Manual of the southeastern flora*: 992-993.

Revised March 1980

SPECIES Elliotia racemosa Muhl.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		x	x	x			x	
Damage	x							
No Lasting Effect								?
Beneficial if Done Properly					x	x		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Elliottia racemosa Muhl.



ERICACEAE

Kalmia cuneata Michx. white-wicky laural  
Chamaedaphne cuneata O. Ktze.

Technical Description

Soboliferous deciduous shrub.

Shoots.--Solitary or few from the crown, the primary shoots slender, erect or leaning on other shrubs, sparingly branched save above, the older wood terete, with bark gray or gray-brown, thin with shallow, irregular, longitudinal cracks, the branching ascending, the new shoots slender, reddish-brown, the internodes somewhat ridged, puberulent, the short hairs mixed with longer, spreading, gland-tipped hairs.

Leaves.--Alternate, erect or ascending, overlapping in spirals, the blades mostly oblanceolate, 3-6 cm long, apically acute to obtuse-angled, sometimes mucronulate, the margin entire, somewhat revolute, the base cuneate then attenuate to make a narrow wing on the short petiole; upper surface smooth, pale yellow-green; lower surface stipitate-glandular.

Inflorescence.--Flowers in contracted, umbel-like racemes from axillary, ovoid, imbricate-scaley buds toward tips of previous season's growth, expanding shortly after the new shoot leaves.

Flowers.--Complete, rotate on slender, spreading, pale green, glandular pedicels 1.5-3.0 cm long; sepals 5, joined at very base, ovate, calyx 7-8 mm broad, somewhat spreading in bloom, firm, acute, entire, green with pale margins, the backs sparsely stalked-glandular; petals 5, joined into a saucer-shaped, shallowly 5-lobed structure, 1.5-2.0 cm broad, the limb of which is 10-pouched opposite the 10 stamens (which in bud are outwardly bent with anthers fitting into the pouches), white with a narrow red band just outside the stamen ring, the inner surface puberulent inside toward the base, the outer surface sparingly stipitate-glandular; stamens 10, 5-6 mm long, the filaments spreading at anthesis, white, linear, somewhat flattened, the bases broadened where attached to a disc, there sparsely hairy, the anthers oblong, pale brown, ca. 0.5 mm long, introrse-poricidal; ovary superior, depressed-globose, glandular-hairy, slightly 5-lobed, the style simple, straight-linear, ca. 7-8 mm long.

Fruit.--Capsule depressed-globose, 4-5 mm long, the dehiscence septicidal; seeds numerous, pale brown, oblong-cuneiform, 0.6-0.7 mm long.

Distribution and Flowering Times

Moist to wet sandy peats or peats of shrub bogs, savannas and sandhills swales, inner Coastal Plain, North Carolina and South Carolina. Flowering from late May into June.

Special Identifying Features

K. cuneata is most similar to, often in mixed populations with, K. angustifolia var. caroliniana (Small) Fern., but differs in being deciduous, rather than evergreen, in its consistently alternate, cuneate-based leaves (rather than

whorled, elliptic or elliptic-lanceolate), and in its flowers which are white with a red-bordered "eye" (rather than pinkish).

#### Habitat and Management Implications

K. cuneata is a shrub of high hydroperiod, highly organic soils. It locally abounds in the shrub bogs or pocosins so common in the pinelands and sandhills of the inner Coastal Plain of the Carolinas. Associated with it in the shrub layer are such general as Myrica, Ilex (glabra, coriacea), Lyonia, Gaylussacia, etc. The overstory, often sparse, is comprised of Pinus serotina, P. taeda, sometimes Chamaecyparis, Magnolia virginiana, Gordonia, (often shrubby), Acer rubrum, Nyssa sylvatica biflora, Liquidambar, etc. It is a part of a fire disclimax, and increases as a result of burns. It does not compete well with other shrub bog species, ultimately being over-topped and suppressed by them. Logging of the overstory, by admitting more light, would increase this species so long as the logging was not accompanied by drainage or radical soil disturbance. Any of the conventional mechanical means of site preparation would eliminate the species. Its main enemies up till now have been management schemes which involve mechanical clearing of the shrub layer, this usually accompanied by digging of drainage ditches, discing and plowing. Even if it survives the mechanical site preparation it is subsequently shaded out by the rows of pine as their crowns close. Some populations in the sandhills have been damaged or destroyed by ponds formed by dams built on the streams it grows along.

#### References

- Ebinger, J.E. 1974. A systematic study of the genus Kalmia. Rhodora 76: 315-398.
- Michaux, A. 1803. Flora Boreali Americana, p. 257. Paris.
- Radford, A.E., H.E. Ahles and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 802-804. Chapel Hill, N.C.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 999-1000. Chapel Hill, N.C.



SPECIES Kalmia cuneata Michx. white-wicky laurel

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		x		x			x	
Damage			x					see note
No Lasting Effect								
Beneficial if Done Properly	x				x	x		

Other Comments: Site drainage destroys this species! Foliage is toxic to livestock.

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Kalmia cuneata Michx.



ERICACEAE

Rhododendron austrinum (Small) Rehder. Florida azalea; Azalea  
Azalea austrina Small

Technical Description

Deciduous shrub, mostly 2-3 meters tall, producing 1-several slender shoots from a shallow but strong root system.

Stems.--Bark of older stems grayish, thin, loosening, that of new shoots reddish brown, puberulent, becoming smoothish. Primary shoots rebranching just below the terminal bud, this rebranching appearing whorled so that oldest shoots develop several sets of "whorls", the appearance of the whole shrub being a broad spreading compound of branch crowns.

Leaves.--Alternate, rather close-set on the numerous new shoots, these unfolding mostly after flowering time. Leaf blades spreading to ascending on short stalks, (these hairy with a mixture of short pale hairs and longer, gland-tipped hairs,) narrowly obovate to oblanceolate, elliptic or oblong, mostly 5-8 cm long, acute and with a short mucro, entire and ciliate, the bases attenuate or cuneate, the upper surface dark yellow green, at first puberulent, later smoothish, the lower surface paler, persistently pilose, at least along the mid-nerve.

Inflorescence.--Flowers arising from ovoid, largish, imbricate terminal buds fully 1 cm long, the scales of which are covered on the backs with white, appressed hairs. Inflorescence a short, compact raceme of spreading flowers, the pedicels slender, puberulent and glandular-hairy, up to 1 cm long.

Flowers.--Corollas mostly salverform, between 3 and 4 cm long, the tube bearing a mixture of white, fine but bristly hairs mixed with a few stalked glandular hairs, the corolla lobes unequal, elliptic to broadly or narrowly triangular, the whole corolla ranging in the species from yellow through all shades of red, very rarely roseate (then probably a hybrid with R. canescens). Flowering calyx cup-shaped, with 5 slightly spreading-triangular, white-hairy and glandular lobes. Filaments elongate, projecting forward then curving upward well beyond the corolla tip, somewhat reddish. Ovary lance ovoid, ca. 4 mm long, densely white-appressed-hairy; style elongated beyond the stamens, curved upward.

Fruit.--Capsules oblong, 1 cm long, or straight or somewhat curved, brownish, puberulent with a mixture of stalked glands.

Distribution and Flowering Season

Rhododendron austrinum, which blooms from February through April, is found in ravines and bottoms from northwest Florida northward and westward into southwestern Georgia, southern Alabama and southeastern Mississippi.

Special Identifying Features

R. austrinum resembles the flame azalea, R. calendulaceum (Michx.) Torr. the closest, but that species has leaves filling as the flowers reach full bloom.

Habitats and Management Implication

This species is found in moist acidic sandy soils, primarily in shadey ravines and bottoms, never where the shallow roots would be flooded over long periods.



Thus in large bottoms it is generally either on rises of sandy alluvium or on the older terraces. Generally the overstory is of willow-oaks, southern sugar maples, beech, Magnolia grandiflora, M. virginiana, lowland hickory. Common associated understory woody plants are such as Rhododendron canescens (with which this hybridizes), Symplocos, Sebastiana, Ilicium, Vaccinium arborescens, other high-bush Vaccinium, particularly V. elliotii. Fairly high intensity logging of the lowlands R. austrinum frequents, so long as some overstory remains, does not seem to affect it adversely. Clear-cutting of such stands is usually accompanied by, if forest is developed, planting of slash pine, to the detriment of this shrub. More often, this sort of bottom, if broad, is converted either to pasture, which reduces its numbers, or to some type of row crop culture, which eliminates it.

These plants are so showy that they are subjected to much cutting and uprooting of whole shrubs. Occasionally the species is seen in cultivation as a result usually of moving the shrubs; more often such transplants lead to failure.

Duncan, W. and Puller, T. K. 1962. Lepidote Rhododendron of the Southeastern U.S. Brittonia 14: 290-298.

Kral, R. 1973. Some notes on the flora of the southeast...Rhodora 75:366-410.

Small, J. K. 1933. Manual of the Southeastern Flora, p. 995. Chapel Hill, N.C.

Wilson, E. H. and A. Rehder. 1921. A monograph of Azalea. P. 219. Univ. Press, Cambridge, Mass.

SPECIES: #75 Rhododendron austrinum (Small) Rehder, Azalea

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage	X		X			X		X
No Lasting Effect								
Beneficial if Done Properly					X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rhododendron austrinum (Small) Rehder





ERICACEAE

Rhododendron bakeri (Lemmon & McKay) Hume

Azalea bakeri Lemmon & McKay

Rhododendron cumberlandensis E.L. Braun

Status: Threatened

Technical Description:

Compact deciduous shrub, rarely exceeding 2 meters, the primary shoots few-to-numerous, erect or ascending, the lower bark thin, with long, longitudinal shallow cracks, forming a pattern of narrowly rectangular platelets, these shoots rebranching to form a broad crown, the rootstock shallow, spreading-diffuse.

Twigs: New shoots of a season as in most Rhododendron, namely slender, straight, mostly subwhorled, with the nodes distant toward shoot base, close toward shoot apex, the surface pale reddish-brown or greenish-brown, from nearly smooth to sparsely puberulent or moderately puberulent with some stouter, longer hairs admixed, but no hairs glandular; older shoots becoming gray-brown, or ash gray, smooth. Winter inflorescence buds ovoid, acute, the imbricate bud scales mostly ovate, acute to rounded, often cuspidate, the backs chestnut-brown to reddish-brown, nearly smooth to appressed-white-puberulent, the thin margins pale, ciliate.

Leaves: alternate-spiral as in other Rhododendron, mostly spreading to ascending, hardened before flower buds open, prevalently oblanceolate to elliptic or narrowly obovate, acute and mucronate, entire to minutely serrulate, strigo-ciliate, on short, nearly smooth to puberulent, also sometimes sparsely hirtellous, e-glandular petioles mostly 2-4 mm long, the blade surfaces above nearly smooth or sparsely incurved-strigo-puberulent, particularly toward the margins, and white-tomentulose along the impressed midvein, beneath hirtellous along the strongly raised midvein, sparsely villosulous along the lateral veins, otherwise nearly smooth, and with no glandular hairs.

Inflorescence: a compact, umbel-like raceme as in many Rhododendron, the slender, straight pedicels mostly under 1 cm long, hirtellous, e-glandular, subtended by inner bud scales and narrowly linear, hairy-tipped scales.

Flowers: bisexual, the corolla very slightly zygomorphic the calyx regular; sepals 5, low-triangular, somewhat scale-like, ca. 1.5 mm long, hirsute-ciliate, the backs sparsely to densely appressed-hirtellous; the petals 5, fused into a tube ca. 2 cm long, this expanding funnelform, the lobes obliquely spreading, lance-oblong or narrowly ovate, acute, short-acuminate, the upper lobe broadest, the whole limb 4-5 cm across; external surface with tube and throat pilosulous, also sparsely short-hirsute with these hairs gland-tipped, the lobes sparsely puberulent with some hairs gland-tipped; color ranging from near yellow through pale to deep orange, deep

orange red or brick red, usually with the upper (broadest) lobe bearing a strong yellow splotch medially toward base inside. Fruit: Capsule cylindrical or lance-cylindric, ca. 2 cm long, strigillose, with no glandular hairs, opening from narrowed apex downward septically, the numerous wedge-shaped small seeds with axile placentation.

#### Distribution and Flowering Season:

Sands and sandy loams, open, moistish to dry woodlands, Cumberland Mountains, Cumberland Plateau, West Virginia and southwest Virginia southward through Kentucky and Tennessee east of the Blue Ridge and local in Valley and Ridge; flowering mostly from early June into July depending on altitude or latitude.

#### Special Identifying Features:

Of the reddish-flowered azaleas this one is the most compact and with perhaps the greatest horticultural potential, so that one good feature is the low, heavily floriferous habit. Its range, flowering time and morphology overlaps most with the true Flame Azalea, R. calendulaceum, but it differs from that species in having slightly smaller flowers, the corolla tube of which has a mixture of short eglandular hairs and longer, sparse glandular hairs (in R. calendulaceum the hairs are longer, often denser, with more and longer gland-tipped ones), the stamens with filaments smooth or sparsely hairy only toward base (in R. calendulaceum hairs extend at least midway up the filaments). R. bakeri flowers expand weeks after the leaves have, while in R. calendulaceum the leaves and flowers expand together. Single populations of each often run the gamut from yellow to red, though R. bakeri tends more toward deep reds than does R. calendulaceum, and may be uniformly red. As Dr. Braun (1941) has commented, there are intergradations between the two species along the contact in the eastern Cumberlands and in the Valley and Ridge, but if degree of hybridization effected the taxonomy toward reducing hybridizing species there would be few azaleas in the southeastern flora.

#### Habitat and Management Implication:

This azalea is a plant of uplands, from moist to rather dry sandy loams in open woodlands whose overstory is made up mostly of oak-hickory-pine. It may share the understory with Kalmia, other Rhododendron, Oxydendrum, Leucothoe, etc. as part of a heath cover, or may be the only heath present. In areas I have seen in the Tennessee and Virginia Cumberlands it seems to persist well in woodlands that have been heavily cut over, in some cases clearcut or even burned, but is eliminated where most methods of

mechanical site preparation have been employed. I have not seen it as understory to plantation of, or dense stockings of Shortleaf, Loblolly, or Virginia Pine. It is poisonous to livestock, though it may be used by deer. Apart from the threat it faces through wholesale blocks of land undergoing or having undergone site preparation it, because of the very showiness of the shrub, is much endangered by vandals and shrub diggers. Also, much of its heart range has been ravaged by strip mining.

References:

Braun, E.L. 1941. The red azalea of the Cumberlands. *Rhodora* 43: 31-35.

Lemmon, W.P. 1937. Notes on a study of the southeastern azaleas with descriptions of two new species. *Bartonia* 19: 14-17.

Fernald, M.L. 1950. Gray's manual of botany, ed. 8, Rhododendron, pp. 1116-1120.



SPECIES: Rhododendron bakeri (Lemmon & McKay) Hume

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		x		X			X	
Damage			x			X		
No Lasting Effect	x							x
Beneficial if Done Properly					X			

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Rhododendron bakeri (Lemmon & McKay) Hume



ERICACEAE

Rhododendron chapmanii A. Gray; Chapman's rhododendron

Azalea chapmanii (A. Gray) O. Ktze.

R. minus Michx. var. chapmanii (Gray) Duncan & Pullen

Technical Description

An evergreen shrub to about 2 m tall, usually less.

Stems.--Habit bushy, the many shoots ascending, the rebranching ascending, stiffish. Bark of older growth thin, gray, slightly breaking away in longitudinal strips, that of new shoots reddish-brown, dotted with old, warty glands.

Leaves.--Alternate, elliptic or obovate, the blades mostly 3.0-6.5 cm long, spreading or ascending on short, glandular-scaly stalks, acute to somewhat rounded, the margins entire, slightly revolute (margin turned under), the base cuneate or short-acuminate, the upper surface dark yellow green and sparingly gland-dotted, the lower surface reddish because of a lot of flattish reddish glands.

Inflorescence.--A short, compact raceme, the individual flowers on ascending, slender, densely glandular pedicels slightly more than 1 cm long. Flower buds terminal on most shoots, the flowers from large, ovoid, imbricate buds, the scales of which are oblong-ovate, rounded or short-acuminate, the backs reddish-gland-dotted, the margins white-ciliate.

Flowers.--Calyx a shallow 5-toothed, stiffly long-ciliate, glandular cup at anthesis (full bloom) about 2 mm long. Corolla with the fused 5 petals funnel-shaped, mostly 3.0-3.5 cm long, the slightly spreading lobes somewhat unequal (the largest lowest), ovate - the tips obtuse angled, the petal surfaces roseate, with a scattering of pale sessile glands. Stamens 10, somewhat unequal, the filaments pale pinkish, projecting the oblong anthers beyond the corolla throat. Ovary oblong-ovoid, superior, about 4 mm long, densely sessile-glandular, the style reddish, elongated beyond the corolla limb, the stigma a glandular, lobed button.

Fruit.--Capsules lance-ovoid, slightly longer than 1 cm, with 5 longitudinal ribs, sessile-glandular, erect on the slightly thickened pedicels. Dehiscence septicidal, the many seeds inequilaterally oblong, pale reddish-brown, finely longitudinally lined.

Distribution and Flowering Season

R. chapmanii, which blooms in March and April, is known certainly to occur in drainages tributary to the Apalachicola River in northwestern Florida, with outliers reported from northeastern Florida, southwestern Georgia and southeastern Alabama. There are few known localities, these best left relatively unpublicized.



### Special Identifying Features

This species, sometimes treated as a variety of *R. minus*, blooms before the new leafy shoot growth commences and has as a rule blunter-tipped leaves.

### Habitats and Management Implication

*R. chapmanii* is soboliferous, producing rather large clones from the parent shrub, and appears to prefer acidic, moist to wet, highly organic sands. Typically it is found in the longleaf pine-turkey oak complex, where this type borders on ti-ti (*Cyrilla*), thus is mainly ecotonal (on the border of the two types). Often it is found mixed with Gallberry (the two species), *Lyonia ferruginea*, *Magnolia virginiana*, never in dense shade but frequently in open stand shade of bordering longleaf. Clear-cutting of the pine-oak type would probably not affect this species adversely, unless it were accompanied by heavy mechanical disturbance. If site preparation for the pine involving soil removal or disruption (root-cutting, windrow-bulldozing, crushing, plowing etc.) were to extend into these shrubs the effect of course would be negative. Burning of the stand would impact the shrubs, but periodic burning is a part of their ecological setting; the species is a prolific sprouter in response to fire. Grazing, may result in mechanical damage to the shrubs, but ericaceous plants are not favored by grazing animals--some indeed are toxic to them. Drainage of the ti-ti type to increase habitat for pine would perhaps constitute a major hazard, drying out the habitat to a bad degree for the rhododendron.

The main enemy of *R. chapmanii* thus far has been the irresponsible gathering of whole shrubs by nurserymen and amateur gardeners to the point where whole clones, even populations, have been destroyed.

### Suggested Reading

Chapman, A. W. 1860. *Rhododendron* in flora of the southern United States. Ivison, Phinney & Co., New York. 621 pp.

Duncan, W. H. and Pullen, T. M. 1962. Lepidote rhododendrons of the southeastern United States. *Brittonia* 14:290-298.

Small, J. K. 1933. *Manual of the southeastern flora*, pp. 997-998.

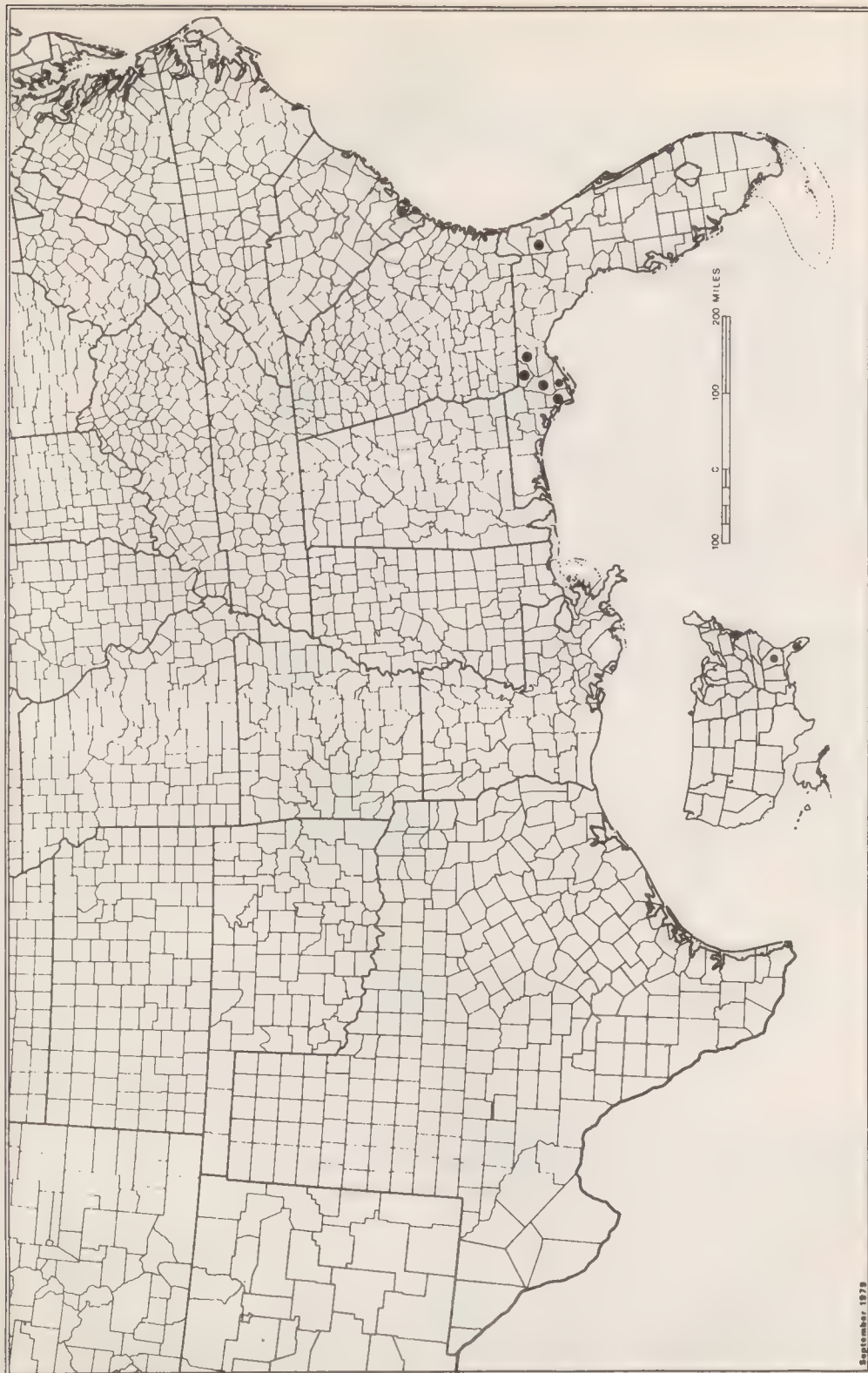
Revised March 1980

SPECIES: #128 Rhododendron chapmanii A. Gray; Chapman's rhododendron

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X		X				
Damage			X					
No lasting effect	X				X	X		X
Beneficial if done properly								

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—



MAP 128. *RHODODENDRON CHAPMANII*



ERICACEAE

Rhododendron prunifolium (Small) Millais. Plumleaf  
azalea, azalea  
Azalea prunifolia Small

Technical Description

Tall shrub, reaching 3 meters, often quite irregularly branched but with branchlets in pseudo-shorls as in the genus.

Stems.--Bark of older shoots mostly gray, smooth, ultimately exfoliating in thin strips, that of new shoots usually reddish-brown, mostly smooth. Overwintering flower-cluster buds narrowly ovoid, the imbricate scales tan, strongly white-ciliate, mucronate.

Leaves.--Fully emerged and hardened by flowering time, spreading on short (3-9 mm) reddish-brown, smooth or sparingly appressed-stiff-hairy shoots, the blades mostly elliptic to obovate or oblanceolate, mostly 4.5-8.0 cm long, acute and mucronulate, ciliate with erect hairs, also minutely serrulate, the bases cuneate, the upper surfaces dark green and smooth except for short, incurved hairs along the midrib, sometimes the lateral veins, the lower surface paler and with longer, appressed hairs along the midrib.

Inflorescence.--Flowers in a cluster few to several, spreading on hirsute, reddish or orangish pedicels to 1 cm long. Calyx a shallow, strongly and broadly-triangularly-lobed cup, the lobes 1.0-1.5 mm long, the backs smooth or stiff-hairy, the margins strongly ciliate with long stiffish hairs.

Flowers.--Corollas nearly salverform, 3-4 cm long, 3.0-3.5 cm. broad, deep red, the tube and lobes with a scattering of spreading, glandular weak hairs on the veins. Stamens with reddish filaments projecting far beyond the corolla tip. Style similarly exserted.

Fruit.--Capsule about 2 cm long, cylindrical, usually with a mixture of short-incurved and longer erect hairs.

Distribution and Flowering Season

R. prunifolium is scattered, mostly in beech-maple-magnolia ravines, in southwestern Georgia and southeastern Alabama, along the Chattahoochee River and its tributary valleys. It blooms in July and early August.

Special Identifying Features

The nearest red-flowered azalea-type rhododendrons to it geographically are of species austrinum, from which it is readily distinguished by its much later blooming time, its more glabrous flowers, its even taller habit. Also, the flowers appear well after the leaves.

Habitats and Management Implication

This azalea is in somewhat dry, to moist, but always mesic situations. In the overstory there may be some pines, particularly P. taeda, P. glabra, but much more often beech, white ash, various southern red oaks, signat hickory, hard maple, Southern magnolia.

Commonly associated shrubs are Kalmia latifolia, Hydrangea quercifolia, Illicium, Sebastiania, various high-bush blueberries, Symplocos. The soil types it is found on vary from sandy clay loams through fine sandy loams, and (as is true for any soil supporting heaths) are quite acid.

In that this species is primarily one of ravine slopes and the soils of these within the range of the azalea are highly erodable, logging of the overstory species of pines and hardwoods should necessarily be selective. The wreckage and erosion found in areas where clear-cutting has been practiced quite plainly demonstrate that R. prunifolium would be at a distinct disadvantage. Such areas generally go over to weedy shrubs, particularly blackberry, vines such as Smilax, Japanese honeysuckle, and Kudzu (where present), all of which would swamp out the original shrub understory that would have survived the logging operation. It therefore appears that this shrub is maintained only through maintenance of the forest soils and a selectively logged overstory. Such areas are sometimes converted to pasture after logging, again with poor results because sites are too steep and erodable for good pasture. There is no information available as to the toxicity to livestock of the foliage of this species, but toxicologists such as Kingsbury (1964) opine that most species of Rhododendron are to be considered toxic.

This azalea is one with considerable ornamental value, has been cultivated commercially to a limited extent. It is definitely in danger even in places where the habitat is maintained, because of the temptation to vandals and bad amateur gardeners.

#### References

- Small, J.K. 1933. Manual of the Southeastern Flora p997. Chapel Hill, N.C.
- Wilson, G.H. & A. Rehder 1921. A monograph of Azalea. Univ. Press, Cambridge. 219 pp.

SPECIES: #129 Rhododendron prunifolium (Small) Millais Azalea

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X				
Damage	X (NA)		X			X	X	
No Lasting Effect								
Beneficial if Done Properly					X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Rhododendron prunifolium (Small) Millais



ERICACEAE

Rhododendron vaseyi Gray. Shell-pink azalea

Biltia vaseyi (Gray) Small

Technical Description

Deciduous shrub 1-3 (-5) m tall, with few to several, erect to ascending primary shoots, the bark grayish or gray-brown, thin, tending to crack longitudinally and exfoliate.

Twigs.--Branching deliquescent, often pseudowhorled (as in most Rhododendron), the bark of older wood grayish or gray-brown, cracking and exfoliating in long, thin plates, that of new shoots more reddish, sessile-glandular, the buds ovate, imbricate, the bud scales glandular-ciliate with backs glandular-punctate.

Leaves.--Alternate, estipulate, spreading on short, glandular petioles, the blades elliptic to obovate, 4-7 (-15) cm long, acute, entire to irregularly crenate-serrulate, also hirsute-ciliate, cuneate, the surfaces dark green, the upper surface scattered-stipitate-glandular, hirtellous along the midrib, the lower surface scattered-hirsute, the long hairs admixed with a scattering of short, sometimes gland-tipped hairs, the midrib and major veins often hirsute.

Inflorescence.--A compact, subsessile, 3-many-flowered terminal raceme reaching anthesis as the leafy shoots expand and forming a showy, ball-like mass 5-10 cm broad of woody smelling flowers, these on slender, spreading, reddish, glandular pedicels ca. 2 cm long.

Flowers.--Irregular, perfect; calyx gamosepalous, ca. 2 mm high, 5-parted, oblique, corona-like, the lobes unequal, low-triangular, glandular-margined, green; corolla gamopetalous, rotate, 2.5-3.0 cm long, the 5 spreading, broadly oblong to ovate, rounded lobes much longer than the campanulate base, somewhat unequal, the lowest largest and the lower laterals next largest, all smooth, shell pink, grading to pale pink mottled with deep rose flecks or streaks toward the throat within, particularly on the lower and lateral petals; stamens 5-7, hypogynous, the filaments unequal, but all slender, pale, arching outward and forward, thus upswept, exserted beyond the corolla, the longest often 3-4 cm long, terminating in broadly elliptic-oblong, poricidal, dorsifixed, rosy or dull purple, smooth, anthers ca. 2 mm long; ovary superior, lance-ovoid, green, stipitate-or-sessile-glandular, ca. 4 mm long, the style outwardly and upwardly swept as are the filaments, often exceeding them, slender, pinkish, stipitate-glandular, the stigma capitate, 5-lobed.

Fruit.--Capsule lance-cylindric, septicidal, somewhat woody, ca. 1.5 cm long, brownish, stipitate-glandular, often with the style persisting.

### Distribution and Flowering Season

Moist to wet, acid swamps and bogs, at elevations of over 3000 ft., Blue Ridge of North Carolina from Ashe County south to Macon and Transylvania counties; flowering in May and June.

### Special Identifying Features

R. vaseyi is very distinctive in that it is the only deciduous Rhododendron in the Southeastern Area that regularly has more than five stamens, yet less than the 10 that consistently are found in the evergreen species (R. minus, R. catawbiense, R. maximum) which also have entire, rather than serrate, leaf margins. Unlike the rest of the "azaleas", the corolla tube of R. vaseyi is much less than 1/2 as long as the corolla limb and the corolla surface is smooth rather than pubescent or glandular-pubescent. One is reminded, on seeing this species in nature, of a deciduous R. minus.

### Habitat and Management Implications

R. vaseyi is always shallowly rooted in moist to wet, acidic, fern-dappled substrates, generally springy sites along mountain streams or in mountain bogs. the overstory may contain Tsuga, Pinus strobus, Picea, mixed with Acer rubrum and other maples, Aesculus, Quercus rubra, Tilia. The understory is mostly heath, being various species of Rhododendron, mostly R. maximum, Leucothoe editorum, Vaccinium, etc., Sambucus, Viburnum (mostly V. cassinoides), etc. The overstory, being composed of several valuable species, has a history of logging. The mechanical disturbance accompanying this however appears to have had little adverse impact, the R. vaseyi often increasing in the artificial clearings and also along rights of way by roads. The main danger facing this particular species comes from the irresponsible and uncontrolled development of vacation and retirement housing in this scenic part of North Carolina, which often results in total habitat destruction. Damming of small mountain streams along which R. vaseyi grows has destroyed some habitat. Drainage has destroyed some bogs. The plants are extremely beautiful in bloom, thus are dug and hauled away by nurserymen and others, mostly amateur gardeners. This last activity is not necessary, since all Rhododendron root easily from cuttings.

### References

- Radford, A. E., C. R. Bell & H. Ahles. 1968. A vascular flora of the Carolinas, pp. 797-801. Chapel Hill, N.C.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 993-998. Chapel Hill, N. C.



Wilson, E. H. and A. Rehder. 1921. A monograph of Azaleas.  
Cambridge, Mass.

SPECIES Rhododendron vaseyi Gray. shell-pink azalea

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA				
Damage	X							
No Lasting Effect								X
Beneficial if Done Properly					X	X		

Other Comments: **site drainage would be deleterious!**

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rhododendron vaseyi Gray





DIAPENSIACEAE

Pyxidanthera brevifolia Wells. Well's pixie-moss

P. barbulata Michx. var. brevifolia (Wells) Ahles

Technical Description

Mosslike, much-branched, creeping evergreen subshrub forming dense low mats.

Stems.--Older shoots slender, with a thin, retangular-anastomosing gray-brown bark; newer shoots cloaked densely by spirally imbricated scale-like remnants of foliage leaves, the more recent growth with the short, pale green internodes densely white-tomentulose.

Leaves.--Mosslike, set in close spirals, spreading or ascending, mostly narrowly elliptic to oblanceolate or lanceolate, mostly 3-5 mm long, somewhat fleshy, firm, acute to narrowly acute or short-acuminate, the tip callus-apiculate, the margin thick, entire, the base acute or attenuate, sessile or nearly so, pale green or sometimes tinged with maroon, the upper surface white-villous-pilosulous, the lower surface essentially smooth or sparsely villous proximally.

Inflorescence.--Flowers solitary and terminal on numerous short branches, closely subtended and surrounded by spreading, closely spiralled leaves of shoot tips and reminding one of the antheridial heads of Polytrichum.

Flowers.--Perfect, regular; sepals 5 (-6), joined at very base, ca. 3-4 mm long, the lobes broadly obovate, rounded, imbricated in bud, reddish-pink, ciliolate; petals usually 5, fused at base, the spreading-ascending lobes broadly spatulate or narrowly obovate, ca. 3-4 mm long, apically broadly rounded, slightly erose, white; stamens 5, alternating with petal lobes, adnate to short corolla tube, the filaments linear, flattened, stiffly ascending, 1.5-2.0 mm long, the truncated apex inflexed, bearing a pair of white, divergent anther sacs slightly longer than 1 mm, each tapering downward to a sharp, conic spur, opening by a transverse slit; ovary superior, ovoid, 3-locular, the style straight, erect, simple, terminating in an obscurely 3-lobed stigma.

Fruit.--Capsule smooth, ovoid, ca. 2 mm long, loculicidally dehiscent; seeds axile, dark brown, reticulate, ca. 0.7-0.8 mm long.

Distribution and Flowering Season

Deep dry sands of open woods, inner Coastal Plain of North Carolina and adjacent South Carolina; flowering in March and April.

Special Identifying Features

P. brevifolia has been considered by many recent workers to be

merely a variant of the commoner Pixie-moss which occurs in dryish pineland barrens, bog edges, from New Jersey southward to eastern South Carolina. Primack & Wyatt (1975) contend that the plants of the high sandhills of the inner Coastal Plain represent a part of a clinal system. The material as represented in the type locality is, however, different in being shorter leaved, with villous tomentum abundant on the upper leaf surfaces, and with smaller flowers. Material from Chesterfield County (Sugarloaf Mt.) South Carolina appears to exhibit characteristics of both. My comments about P. brevifolia are confined to the comparatively "pure" populations of Harnett County, North Carolina.

#### Habitat and Management Implications

The ideal habitat for P. brevifolia is deep, dryish, coarse sand with a scattering of longleaf pine and turkey oak dominant in the overstory and in the understory Vaccinium, Gaylussacia, other ericads, these becoming most abundant in the swales. Selaginella arenicola, Stipulicida setacea, Arenaria caroliniana, Baptisia (several species), Euphorbia, Lithospermum carolinense, Tradescantia (especially T. rosea), Opuntia, Heterotheca (particularly the local H. pinifolia), grasses such as Aristida, Sporobolus, Andropogon, Leptoloma, Panicum, populate the sands together with several sorts of lichen and dryland bryophytes, but the overall effect is one of considerable bare patches of substrate. The pixie-moss forms large clumps, often around the bases of the trees, tending to be more compact in habit on the driest sites, on slightly moister substrates more trailing in habit. Mechanical site preparation techniques would be devastating to these shallow-rooted mat formers, though single tree removal or clear cutting would probably not effect them adversely. These sandhills have had a history of fire, thus as a factor it has probably tended to maintain a vegetational type favorable to the pixie-moss.

At present the major threat to Well's pixie-moss has come from development of some of the sandhills for residential purposes. The largest patch (type locality) has actually been largely destroyed through the construction of a large mobile home sales part (at Spout Springs).

#### References

- Ahles, H. E. 1964. New combinations for some vascular plants of the southeastern United States. Journ. Elisha Mitchell Sci. Soc. 80: 172-173.
- Primack, R. B. & R. Wyatt. 1975. Variation and taxonomy of Pyxidanthera (Diapensiaceae). Brittonia 27 (2): 115-118.

Radford, A. E., H. E. Ahles & C. R. Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 817-819. Chapel Hill, N.C.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1018-1020. Chapel Hill, N.C.

Wells, B. W. 1929. A new pixie from North Carolina. Journ. Elisha Mitchell Sci. Soc. 44: 238-239.



SPECIES Pixidanthera brevifolia Wells. Well's pixie-moss

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Pyxidanthera brevifolia Wells



DIAPENSIACEAE

Shortia galacifolia T. & G. Ocone bells  
Sherwoodia galacifolia (T. & G.) House  
Shortia galacifolia var. brevistyla P.A. Davies

Technical Description

Smooth, evergreen perennial herb or subshrub forming mats by shallow, short or elongate, stoloniferous and creeping rhizomes.

Leaves.-- Alternate, close-set and developing in rosettes from nodes at various intervals along the creeping or arching rhizomes, forming from solitary or clustered imbricate-scaley buds, these scales not persisting through the season, lance-ovate, usually 1 cm or less long, acuminate, entire, subtending either axillary buds of 1-3 (-4) flowers or sterile shoot leaves; leaves of floriferous shoot buds consisting of scales only; leaves of sterile shoots numerous, the lowest above the scales much reduced in petiole, the short blades broadly elliptic to suborbicular, marginally denticulate, the denticles gland-tipped, the larger leaves several, mostly 10-20 cm long, 2/3-3/4 petiole, the petioles green, linear, narrowly winged, the blades broadly ovate, obovate, broadly oblong or (mostly) suborbicular, mostly 4-8 cm long, apically rounded, subtruncate, or broadly retuse, the margin crenate-sinuate, crenate-dentate or dentate, each 'tooth' tipped by a short-excurrent vein tip, the base cordate or rounded; upper blade surface a deep glossy green, the lower surface pale green; venation pinnate, reticulate.

Flowers.-- Regular, bisexual, mostly 1-3 (-4) from a bud, solitary at erect, spreading or slightly nodding tips of slender, erect or ascending, pinkish or reddish peduncles 5-20 cm long, these bearing at or toward their apices 3-4 lanceolate, acuminate, entire and narrowly scarious-white margined, red to pink or pale green, scaley bracts 5-10 mm long, the uppermost ones directly subtending the flower; sepals 5, distinct, imbricate, greenish, lanceolate, oblong or ovate-lanceolate, mostly 5-8 mm long, acute, emarginate or rounded, the margin entire, the surface green or tinged with red, the edge narrowly white-scarious; petals 5, fused at base, the corolla 1-2 cm long, campanulate, the lobes obovate, the rounded apex jagged or erose, the surface white or faintly pink; stamens 5, epipetalous, alternating with petals, departing about midway up the corolla tube, the linear-flattened, yellowish-white filaments ca. 5 mm long, crooked apically, the yellowish-white anthers basifixed, ovoid, pointed inward to touch the style, ca. 0.5 mm long, the anther sacs slightly divergent; staminodes 5, opposite petals at base of corolla, the filaments flattened, short, ca. 0.5 mm long, the blades ovate, flat, yellowish-white, ca. 3 mm long, acute, villosulous-edged; ovary superior, broadly ovoid, 3-carpellate, the style single, erect, linear, elongate (mostly 1.0-1.5 cm long), the stigma capitate, obscurely 3-lobed.

Fruit.-- A greenish, ovoid, 3-locular, loculicidal capsule 5-6 mm long, invested by the persistent calyx and ripening in summer; seeds numerous on axile placentae.



## Distribution and Flowering Time

Cool, acidic ravines of the Blue Ridge Escarpment, mostly in the drainages of the Horsepasture, Toxaway and Keowee Rivers of South Carolina and North Carolina; also northeastern Georgia; flowering from late February through March into early April.

## Special Identifying Features

There are no other New World species of Shortia, though the genus is found in Asia. Nearest to it in the family in the southeast is the common Galax, G. aphylla, which occupies similar habitat or drier sites, and which produces its much smaller, whitish flowers numerous in elongate, spike-like racemes; in Galax the staminodia are longer than the stamens.

## Habitat and Management Implications

This plant, while very local in distribution, is usually quite abundant in the few localities left to it after the wholesale damming up of streams within its area. A typical site would be a deep stream cut through granitic rock where the overstory is comprised of a mixture of cove hardwoods, hemlock, and white pine, the understory made up mainly of heaths such as Leucothoe, Rhododendron (mostly maximum, minus), Kalmia, various Vaccinium, Galyussacia. The soil is usually a strongly humus-enriched moist sand, very acidic. In such sites Shortia may cover the steep slopes along the streams, sometimes to the exclusion of other ground cover, often forming clones several meters across and even extending along old windfallen trunks or over stumps of trees. It appears to be most abundant where shade is heavy, where soil does not dry out and the atmosphere where it grows best is both cool and humid, being kept that way by the insulating effect of the forest and steep ravine slopes. The species has been extirpated over most of its former range by wholesale damming up of streams and rivers, most of its best habitat now under the waters of either Lake Jocasee or Lake Toxaway, only the upper reaches of the streams of these areas now supporting Shortia. Other populations have been endangered through land development or excessive logging of the steep ravines such plants frequent. In that the species depends on a stable, humus-enriched, cool, shaded habitat it should be obvious that logging within its area be kept to a minimum, this being done on a basis of single tree selection if at all.

## References

- Davies, P.A. 1952. Geographical variations in Shortia galacifolia. Rhodora 54: 121-124.
- \_\_\_\_\_. 1955. Distribution and abundance of Shortia galacifolia. Rhodora 57: 189-201.
- \_\_\_\_\_. 1956. Type location of Shortia galacifolia. Castanea 21: 107-113.
- \_\_\_\_\_. 1959. Remarks on the Virginia location of Shortia galacifolia. Rhodora 61: 297-301.
- Duncan, W.H., H. Venard, and G.W. McDowell. 1950. Shortia galacifolia from Georgia, Rhodora 52: 229-232.

- Gray, A. 1841. Notes of a botanical excursion to the mountains of North Carolina. Am. Journ. Sci. 42: 1-149.
- House, H.D. 1908. The genus Shortia. Torreyia 7: 233-235.
- Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas, p. 818. Chapel Hill, N.C.
- Redfield, J.H. 1879. Notes on a botanical excursion into North Carolina. Bull. Torrey Bot. Club 6: 331-339.
- Rhoades, M.H. 1966. Seed germination of Shortia galacifolia T. & G. under controlled conditions. Rhodora 68: 147-154.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1018-1020. Chapel Hill, N.C.
- Vivian, V.E. 1967. Shortia galacifolia, its life history and microclimate requirements. Bull. Torr. Bot. Club 94: 369-387.

SPECIES Shortia galacifolia T. & G. Oconee bells

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA		X	NA	
Damage	X				X			
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Shortia galacifolia T. & G.



PRIMULACEAE

Lysimachia asperuliaefolia Poirett

Status: Endangered

Technical Description:

Perennial clonalizing herb from a moderately deepset, horizontal, fleshy, terete rhizome, this elongate, ca. 5 mm thick, pinkish, the numerous nodes producing opposite, low-triangular scales as well as diffuse-fibrous roots.

Stems: erect, stiffish, terete, smoothish, mostly 3-6 dm tall, unbranched below the inflorescence, the lowest nodes approximate, the internodes progressively lengthening up the stem, below with flesh-pink tones and finely ribbed, upwardly becoming pale yellow-green and ribless, proximally smooth, distally and in inflorescence minutely stipitate-glandular, the glands reddish.

Leaves: lowermost leaves erect, scaly, mostly narrowly triangular, firm, brownish, 1 cm or less long, in whorls of 3, increasing in length gradually up to mid-stem or above, where largest, in whorls of 4, spreading, sessile or subsessile, narrowly to broadly lanceolate, 2-5 cm long, 8-20 mm wide, acute or acuminate, entire or slightly revolute, broadest at the rounded base, the upper surface deep yellow-green, smooth, lustrous, minutely glandular-punctate, impressed veiney, the main veins subparallel, palmate-arcuate, with at least 1 strong pair of laterals, the lower surface much paler with the glandular punctations darker by contrast, smooth, the veins, particularly the midrib, strongly raised, the uppermost leaves abruptly smaller in the inflorescence, usually minutely stipitate-glandular, particularly on the veins beneath.

Inflorescence: a compact to somewhat loose, indeterminate, terminal cylindrical raceme 3-8 cm long of several whorls of bracts each subtending a whorl of as many pedicels, these spreading or ascending, slender, straight, at anthesis mostly 8-10 mm long, pale green, stipitate-glandular-puberulent.

Flowers: bisexual, regular, showy; sepals spreading, narrowly triangular, to 5 mm long, green strongly dotted with large red glands, narrowly acute, apically ciliate with stipitate glands, parallel-nerved, the surfaces smooth; petals 5, joined only at very base into a short, broad tube, the spreading lobes mostly oblanceolate or spatulate, ca. 1 cm long, broadly acute, the margin apically erose or ragged, the lower margin entire, the base cuneate, the marginal area on both sides stipitate-glandular with yellow glands, the surface a bright, deep butter yellow, medially with a zone of small reddish-orange, lens-shaped mottlings (glands); stamens 5, epipetalous toward petal tube base, the filaments attached opposite corolla lobes, forming a low yellow corona ca. 2 mm high, its external surface pebbled with sessile yellow glands, the free filament pale yellowish, tapering-linear, 3.0-3.5 mm long, erect, stipitate-yellow-glandular, the anthers lanceolate, ca. 1.5 mm long, orange-yellow, basifixed, erect, the 2 locules somewhat divergent at base; ovary superior, greenish, concealed in the staminal tube, the style elongate, narrowly lineal, tapering gradually into the simple short stigma.

Fruit: a broadly ovoid or subglobose capsule ca. 4.5 mm high, externally smooth, straw-colored, with red mottlings, the slender erect style persisting, stipitate-glandular.

#### Distribution and Flowering Season:

Sandy moist peat of pine flatwoods savanna and seep bogs in sandhills, very rare and local in the Coastal Plain of the Carolinas; flowering in May and June.

#### Special Identifying Features:

Of those southeastern Lysimachia with whorled leaves and terminal, racemose inflorescences there is but one other with which L. asperulaefolia might be confused, namely L. loomisii. The two are often found together. However, L. loomisii has narrower leaves, these rarely reaching 8 mm in width, which lack the small stipitate glands found on leaves and bracts of L. asperulaefolia, and which have a stronger taper at the base (those of L. asperulaefolia are broadest near the very rounded base!). The flowers of L. asperulaefolia are appreciably larger, with more glands on sepals and both sides of petals, these not evident or as evident in L. loomisii.

#### Habitat and Management Implication:

This is a genuinely rare and local plant, undoubtedly endangered. It normally roots in high hydroperiod, black sandy peats such as are found either in seep bog pocosin or boggy flatwoods savanna. In varied proportion in the overstory are Pinus palustris, P. serotina, Taxodium ascendens, occasionally Chamaecyparis, mixed with such hardwoods as Nyssa biflora, Acer rubrum, Magnolia virginiana. The shrub layer is characterized by an abundance of Ilex glabra, I. coriacea, Myrica cerifera, M. heterophylla, Persea, Cyrilla, Clethra alnifolia, together with many sorts of ericads such as (percentages vary with locale) Kalmia angustifolia, many high and low-bush Vaccinium, Gaylussacia, Zenobia, Leiophyllum, several Rhododendron, particularly R. atlanticum, Lyonia, Leucothoe, etc. Sphagnum and other bog bryophytes carpet the ground.

Where fire has been of common occurrence, substantial clearings dominated by grass-sedge bog communities have developed and these are suited to the Lysimachia. Frequent associates are Lycopodium, Woodwardia virginica, Osmunda, Ctenium, various Paspalum and Panicum, Andropogon, Aristida, Carex, Rhynchospora, Scirpus, Dichromena latifolia, Xyris, Eriocaulon, Lachnocaulon, Zygadenus, Tofieldia, Aletris, Iris, Spiranthes, Pogonia, Cleistes, Sarracenia, Drosera, Dionaea, Psoralea psoralioides, various Polygala, Hypericum, Rhexia, Phlox, and bog asclepiads. Composites are many, but mostly not in flower, though Helenium, Coreopsis (falcata), Erigeron (annuus) may be present and showy.

As may be deduced from the above description of associates, L. asperulaefolia is then a plant of highly organic, high-hydroperiod, sands and has been maintained historically through creation of area for it by periodic woods fires. It may grow for a time in savanna that is being invaded by woody species, but is ultimately crowded out unless a new burn occurs. Similarly, it will not persist in dense stands of pines or hardwoods. The few remaining known populations would best be maintained by saving them from drainage, by removal of trees with minimal damage to substrate, by periodic controlled burns. Pine plantations preceded by drainage and mechanical site



preparation are definitely not the answer.

References:

Radford, A.E., H.E. Ahles & C. Ritchie Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 819-823.

Small, J.K. 1933. Manual of the southeastern flora, pp. 1023-1024.

Approximate Distribution of:  
Lysimachia asperuliaefolia Poir.



OLEACEAE

Chionanthus pygmaeus Small. Pygmy fringe-tree

Technical Description

Shrub or small tree to ca. 15 feet tall, the bark gray-brown, thinnish, longitudinally cracking.

Twigs.--Opposite or subopposite, stiffish, grayish or gray-brown, on newer shoots often with 4 low ribs along the internodes below the sides of the semicircular, concave leaf scars; leaf scars mostly opposite, sometimes alternate; terminal bud ovate-triangular, ca. 4 mm long, the several scales imbricate, reddish-brown, ciliate; axillary buds similar but smaller.

Leaves.--Opposite or alternate, estipulate, simple, spreading or ascending, mostly 3-10 cm long, the petioles short, the blades somewhat leathery, ovate to elliptic or obovate, acute to rounded, entire, attenuated to the petiole, the upper surface dark yellow-green, smooth, the lower surface paler, glabrescent (becoming smooth), reticulate.

Inflorescence.--Showy, appearing with the new shoots from the axils of most leaf scars of the previous season, a leafy-bracted panicle, the larger bracts opposite, spreading or ascending, mostly elliptic or oblong, becoming similar to but smaller than foliage leaves, proximally on the axis, but reduced upward in the inflorescence to linear, 3-4 mm long, the peduncle rather short, its opposite branches numerous, spreading, slender, drooping, terminating in 3-6-flowered cymules, the whole inflorescence multiflowered and feathery.

Flowers.--Regular, perfect, very pleasantly fragrant; sepals 4, green, ca. 1.5-2.0 mm long, united at base, the lobes triangular; petals 4, white, united at base to a short, campanulate throat, the lobes narrowly linear, 1.0-1.5 cm long, somewhat spreading, stamens 2, opposite, adnate to corolla base and falling with it, the erect greenish filaments ca. 2 mm long, the yellowish basifixed anthers oblong, blunt-tipped, ca. 2 mm long; ovary superior, ovoid, slightly over 1 mm long, the single erect, terminal style somewhat shorter, apically with a bilobed stigma.

Fruit.--Drupes 2.0-2.5 cm long, oval, green becoming purplish-brown when ripe.

Distribution and Flowering Season

Sandhills and sandy scrub, lakes region of southern central peninsular Florida; flowering from March into April.

Special Identifying Features

If this is a species it shares the southeastern area with but one



other of the genus, namely the common fringetree C. virginicus L. which does occur in northern and middle peninsular Florida. However, this last often becomes a small tree whose leaves are thinner, whose petals are longer (mostly with lobes 2-4 cm long), whose anthers have apiculate or acuminate tips, and whose fruit is seldom as large. C. pygmaeus, as is so often the case with woody plants in sandhills, often looks shrubbier than it really is, in that blowing, drifting sands build up around it to the point that only the upper branches are exposed.

#### Habitat and Management Implications

This rare woody plant is confined to the deep, yellow or white sands of the peninsular Florida scrub. Usually it is on sandhills, either under longleaf pine-deciduous scrub oak or in the denser growth of the sand pine-evergreen oak type. In the latter type, if the sands have become stabilized by the various scrub species, its growth may become quite spindly and elongated, thus plants may reach as much as 15 feet. In the more exposed sites it is much more compact, lower, shrubby. Common associates in the sandscrub are Quercus myrtifolia, Q. chapmanii, Q. geminata, Carya floridana, Persea humilis, Lyonia ferruginea, Ilex ambigua, Bumelia tenax, Garberia, Ximinea, Osmanthus megacarpa, Ceratiola, etc. The scrub has had a long history of fire, some of the severe ones burning such plants back to the base, eliminating such as Ceratiola. However, most sandhills species are biologically adapted to fire, many sprouting vigorously afterward. The sparse overstory of pines has been cut or burned often and, in that most understory woody species of shrubs or small trees are less dense or absent from dense stands of pine in the overstory, it is assumed that reduction of the overstory favors increase of such species as C. pygmaeus.

The main problem with C. pygmaeus is not from the fire or logging, but instead is the "suitability" of the sandhills for cultivation of orange trees which now occupy the bulk of the former range of this showy rarity. Also, much of the scrub has been converted to housing lots for the rapidly expanding towns and communities of the south Florida highlands. It is suggested, in fact, that the status of C. pygmaeus be changed from "threatened" to "endangered".

#### References

- Hardin, J. W. 1974. Studies of the southeastern United States flora. IV. Oleaceae. Sida 5: 274-285.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1041-1042. Chapel Hill, N. C.

SPECIES Chionanthus pygmaeus Small. pygmy fringe-tree

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Chionanthus pygmaeus Small





LOGANIACEAE

Spigelia gentianoides Chapm. gentian pinkroot

Technical Description

Smoothish, delicate perennial from a shallow, jointed, ascending rhizome.

Stems.-- Usually single, erect, slender but stiff, mostly 1-3 dm tall, toward base terete, maroon, ca. 1 mm thick, upwardly becoming green, the internodes sharply ridge below leaf margins, the ridges scabrid.

Leaves.-- Opposite, decussate, sessile-clasping, with minute, fimbriate stipules; lowermost pairs smallest, often scale-like, grading sharply to the largest which are from midstem to inflorescence spreading, the blades mostly elliptical, narrowly ovate or lanceolate, 3-5 cm long, 1-2 cm broad, acute, the margins scarbid, the base acute, the venation pinnate-arcuate, the upper surface deep green, scaberulous, the lower surface paler, minutely scabrid only along the veins.

Inflorescence.-- A short, few-flowered, erect, terminal, spikelike raceme, the raceme axis angulate, the angles scabrid.

Flower.-- Regular, bisexual; pedicel stout, rarely longer than 1.5 mm, a slight contraction of the calyx; calyx of 5 sepals, these fused only at base, linear-lanceolate, 4-6 mm long, erect, greenish, minutely scabrid, particularly along margins; corolla gamopetalous 2.5-3.0 cm long, of 5 petals, the tube tubular-funnelform, ca. 1 cm long, broadening to a broadly cylindrical throat which narrows slightly distally just below the base of 5, triangular, erect, acute, scabrous edged lobes 5-6 mm long; corolla surface pale pink, the tint somewhat deeper along edges of the lobes; stamens 5, epipetalous, the filaments projecting inward at a level ca. 1 cm above corolla base, fleshy, ca. 2 mm long, the anthers linear-oblong, ca. 3 mm long, yellow, basifixed, erect, connivent around the style apex; ovary superior, carpels 2, style 1, erect, terete, 1.4-1.5 mm long, minutely pilose, the stigmatic tip truncate,

Fruit.-- A strongly bilobed capsule, this exceeded by the erect, persistent sepals; seed not seen.

Distribution and Flowering Time

Sandy loam of upland woods, northwestern Florida; flowering in May and June.

Special Identifying Features

S. gentianoides overlaps the range of but one other species of Spigelia, namely the wide-ranging and commoner S. marilandica, a taller, larger-leaved, lump former with corollas crimson outside, yellow within, and with stamen tips protruding from the corolla throat rather than being included.

Habitat and Management Implications

This species has been observed but twice since the time Chapman described it, and in both cases was found in oak-pine woods. The soil is a moist or

seasonally dry sandy loam, topped by a thin layer of dark, unincorporated humus. The plants are in light to heavy shade of an overstory of pine (usually a mixture of P. taeda, P. palustris) and hardwoods consisting mainly of Quercus nigra, Q. hemisphaerica, Q. falcata, Nyssa sylvatica, with the understory layer and shrub layer comprised mainly of Cornus florida, Vaccinium arboreum, Rhododendron canescens, Gaylussacia frondosa, G. dumosa, Rubus spp., Smilax spp., Rhus toxicodendron, both high and low-bush Vaccinium. Among herbaceous associates are Mitchella repens, Gentiana villosa, Scutellaria elliptica, Polygala polygama, Pedicularis canadensis, Agrimonia, Chasmanthium, Amianthium. However, none of the herbaceous associates are abundant, and the Spigelia plants are seldom around the bases of the shrubs. More often they appear singly or in small groups beneath the oaks and pines, usually with nothing around them but leaf litter in various stages of decay. Clearcut areas adjacent to the Spigelia show no plants. The area shows some history of fire, none of cultivation. It is doubtful that such a species as this would survive clear cutting which would admit too much light, the result being a drying out and reduction of the humus fraction of the soil. Certainly the Spigelia would not survive mechanical site preparation and the overstory species substitution involved with pine monoculture.

#### References

- Chapman, A.W. 1860. Flora of the Southern United States, pp. 200-201. Cambridge, MASS.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1045-1046. Chapel Hill, N.C.

SPECIES Spigelia gentianoides Chapm. gentian pinkroot

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X		X	X	
Damage								X*
No Lasting Effect								
Beneficial if Done Properly					X			

Other Comments: plants are poisonous to stock, may not be taken,  
but trampling of habitat would likely be injurious.

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Spigelia gentianoides Chapm.



LOGANIACEAE

Spigelia loganioides (T. & G. ex Engl.) A.DC. Florida pinkroot  
Coelostylis loganioides T. & G. ex Engl.

Technical Description

Smooth perennial herb from a slender, short-stoloniferous rhizome.

Stems.-- Erect or decumbent, simple or sparingly branched from near base, 1-4 dm tall, frequently rooting from nodes of decumbent base, slender, ca. 1 mm thick, proximally subterete, purplish, upwardly becoming greenish, somewhat quadrangular or ridged between nodes below bases of leaf margins, these ridges sparsely scabrid just below nodes.

Leaves.-- Opposite, spreading or ascending, producing erect, triangular, scale-like stipules, sessile, the outermost pairs short, scale-like, mostly distant, grading to largest at midstem or above, these narrowly ovate to elliptic or oblanceolate, 2-4 cm long, mostly bluntly acute or short-acuminate, marginally entire and minutely scabrid, the base cuneate or short-attenuate, pinnately veined with few pairs of laterals, these arcuate, the upper surface deep green, smooth or nearly so, the lower surface paler, minutely papillate along the raised veins; blades gradually or not at all reduced in the inflorescence.

Inflorescence.-- Flowers solitary or few (2-3) in erect, nearly sessile spikelike racemes, these alternate from each pair of upper leaves (bracts).

Flowers.-- Regular, bisexual, erect on short, green scabrous pedicels or nearly sessile, the pedicels often with 1-3 lance-linear bracteoles no longer than 1 mm, the uppermost directly under the calyx; sepals 5, fused at very base, erect, narrowly triangular, greenish, 3.0-3.5 mm long, narrowly acute, the margins minutely scabrid; corolla of 5 strongly fused petals, 1.2-1.5 cm long, white, the narrowly funnelform throat ca. 5 mm long, the throat broadly cylindrical, ca. 4-5 mm long, the lobes spreading in late morning, triangular, 3-4 mm long, bluntly acute, slightly involuted; stamens 5, alternating with petals, epipetalous, the linear, terete, white filaments ca. 1 mm long, directed inward from base of corolla throat the erect, basifixed, yellow anthers linear-oblong, ca. 1.0-1.3 mm long; ovary superior, subtended by a prominent disc, ovoid, 2-carpellate, the style greenish, erect, stoutly linear, ca. 2.5 mm long, continuous with a linear, hispidulous, acute stigma 4.0-4.5 mm long.

Fruit.-- A strongly bilobed capsule, the lobes (locules) nearly round, 3.0-3.5 mm high, few-seeded.

Distribution and Flowering Season

Very local in calcareous hammocks and rises in river bottoms, northern peninsular Florida; flowering from May into July.

Special Identifying Features

This species is distinguished from the other 3 southeastern Spigelia as follows:

1. When stems branch, the branches are produced from the plant base.
2. Flowers are produced from axillary racemes.

3. The corolla is white, smaller than either S. marilandica or S. gentianoides; the style is about as long as the linear hispidulous stigma.

#### Habitat and Management Implications

S. loganioides is on moist, well-drained, sandy silt-loams of calcareous woodlands, usually in deep shade of Cabbage palm, Live oak, Willow oak, Sweet gum, Loblolly pine hammock, or in river bottom forest of the same type where it appears on high water banks or low natural levees, areas that would be inundated rarely, even though contiguous to real swamp forest. Frequent herbaceous associates are Dyschoriste humistrata, Ruellia, Elytraria, Arisaema, Mitchella, Carex, Chasmanthium, Panicum (Dichantherium such as D. commutatum), etc. The habitat is sensitive, ecotonal; the plants appear not to react well to logging or pasturing disturbance. Several localities where it was once observed have now been destroyed by either clear-cutting for agriculture and forestry, or by conversion to pasture. The genus is known to be poisonous to livestock, but trampling by livestock surely eliminates this species.

#### References

- Chapman, A.W. 1897. Flora of the southern United States, pp. 200-201. Cambridge, MASS.
- Small, J.K. 1933. Manual of the southeastern flora, 1044-1045. Chapel Hill, N.C.



SPECIES Spigelia loganioides (T. & G. ex Engl.) A.DC.

Florida pinkroot

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X	X (if pine)	X
Damage								
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments: Site drainage is detrimental! Grazing detrimental in that stock trample plants (which are suspected of being poisonous).

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Spigelia loganioides (T. & G.) A. DC.



GENTIANACEAE

Gentiana pennelliana Fern. Wiregrass gentian

Dasystephana tenuifolia (Raf.) Pennell

Technical Description

Perennial, glabrous, the short caudex (underground erect rhizome) with a cluster of elongate-spindleform fleshy roots.

Stems: 1-few, mostly 1-3 dm. tall, erect or leaning, slender and brittle, mostly 2 mm. or slightly less thick, tapering into the rootstock, there pale, above greenish or tinted with maroon, with narrow, winged ridges, all flowering or with some shoots strictly leafy.

Leaves: Opposite, approximate to well separate, the lowest reduced and scale-like, those at midstem or above usually largest and longest, mostly 2-3 cm. long, linear or elliptic linear, narrowly acute or acuminate, entire, narrowing but slightly to clasping bases, somewhat fleshy, but flat, both surfaces green.

Inflorescence: Flowers pedicellate, either solitary at tips of simple stems or 2 because of an apical stem fork, in any event terminal, 5-6 cm. high, the pleated buds opening only in sunlight.

Flowers: Calyx 2.5-3.0 cm. long, the narrowly campanulate tube shorter than the 5 unequal lobes, these linear, similar to leaves, slightly spreading, acute, green or with tints of maroon. Petals expanding from a tubular base to a funnellform throat, thence to 5 ovate, spreading lobes 1.5-2.0 cm. long alternating with jagged-based sinuses; interior surfaces white, externally greenish-purple at upper corolla tube, darker along lateral veins with lobes tinted with greenish-blue or purple, white toward inner edges (in relation to position in bud). Stamens 5, the white, basally expanded filaments arising toward apex of corolla tube, 7-12 mm. long, the anthers triangular (anther sacs separate at base).

Fruit: A capsule ca. 1.5 cm. long, the small seeds winged.

Distribution and Flowering Season

Sandy peat of moist to wet pineland savannas or pineland clearings, northwestern Florida. Flowering October into March.

Special Identifying Features

This species is closest to G. autumnalis (G. porphirio), a species of similar habitats in the Atlantic Coastal Plain from New Jersey and Delaware southward into South Carolina, but which has blue flowers and longer stamens.

Habitats and Management Implication

G. pennelliana is found on black, humus or peat-enriched, constantly moist sands together with a wealth of grass and sedge species and a variety of savanna forbs. The overstory savanna species are mainly Slash Pine, Longleaf Pine, Pond



Pine, occasional Pond Cypress, Nyssa biflora, Myrtle, Red Bay, Virginia Bay, Cyrilla, Cliftonia. It is usually in the grass-sedge zone bordering Hypericum ponds or Titi on the wet side, Longleaf Pine-Saw Palmetto-Wiregrass on the dry side. Its thickened roots allow it to survive fire, the factor which historically has maintained the clearings this species of sunlight requires.

G. penelliana is never abundant, therefore most methods of wholesale site preparation involving mechanical disturbance of the soil will eliminate it. Site preparation involving only controlled burning will probably favor it, providing the area is not drained. Should G. pennelliana survive any mechanical site preparatory method, that method would be bedding, but the shade of a well-stocked plantation of pine would soon destroy the gentian.

#### References

- Pringle, J. S. 1967. Taxonomy of Gentiana, sect. Pneumonanthae, in eastern North America. Brittonia 19 (1): 1-32.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1052-1054.

Revised March 1980

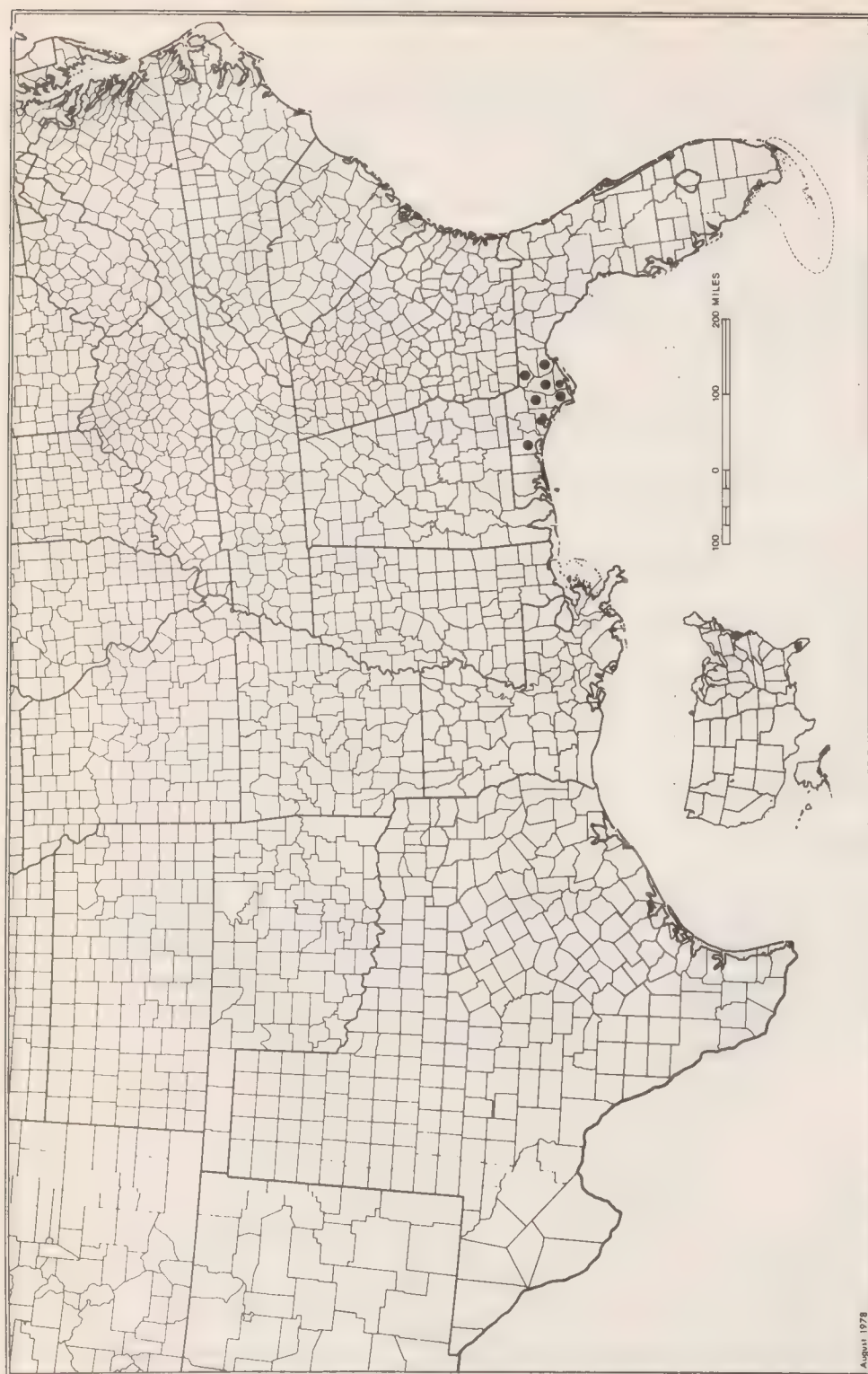
SPECIES: #59 Gentiana pennelliana Fern. Wiregrass gentian

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Craze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



MAP 59. *GENTIANA PENNELLIANA*



ASCLEPIADACEAE

Asclepias viridula Chapm.; southern milkweed, Milkweed

Technical Description

Perennial herb from a large, elongate-oblong, vertical rootstock.  
Stems.--Spreading or erect, 1-several, slender and wand-like, 3-6 dm long, greenish or tinted with purple toward the base, terete, smooth other than for a vertical line of low, weak, whitish hairs between nodes.  
Leaves.--Opposite, linear, 5-10 cm long, mostly 2-3 mm broad, spreading-ascending, broadening slightly toward the acute tips, smooth or with some roughening toward and along the margin above, 1-nerved.  
Inflorescence.--Umbels from axils of all or most upper leaf pairs, on slender, sparsely puberulent peduncles between 1 and 2 cm long, with involucre bracts 2-3 mm long, narrowly triangular, scabrous-margined, with rays numerous, between 1 and 2 cm long, angulate, purplish on the backs, greenish and puberulent on a line within.  
Flowers.--Symmetrical, smallish, the calyx lobes 5, narrowly ovate, reflexed, 2.5-5.0 mm long, glabrous, the upper (inner) surface pale green, the lower (outer) surface darker green tinted with maroon. A short (1 mm) unit of column arises from the calyx and from it the 5 petals arise, the boat-shaped hoods pouched toward the base, narrowly ovate or slightly obovate, 3-4.5 mm long, the tips narrowly or broadly rounded, the margins with a triangular auricle toward base, the backs yellowish or whitish green with a purplish mid-rib zone; from within the petal "pouch" arises a narrow, yellowish or greenish-white, incurved horn about as the hood. Anther head ca. 1 mm long, 1.5 mm broad.  
Fruit.--Follicles smooth, erect, narrowly fusiform, 8-10 cm long.

Distribution and Flowering Season

Moist acidic pineland savanna, northeastern and northwestern Florida; flowering from April through July.

Special Identifying Features

Asclepias viridula is superficially much like A. longifolia Michx. in habit, leaf character and flower size; however that species has an anther head longer than the corolla, which itself is somewhat broader and lacks horns.

Habitats and Management Implication

This threatened species is usually found in large or small clearings dominated by grasses and sedges or in large, fire created savannas dotted with slash and long-leaf pine with an understory of saw palmetto interspersed with gallberry and wax myrtle or, in wetter places with shrubby Hypericum or titi-black gum. Its substrate is typically a highly humified, thus blackish, fine sand which remains moist or wet for most of the year. Thus it is a plant of high hydroperiod soil which undergoes gleization.

It, a cormophyte, together with other threatened or endangered species with which it frequently associates (such as Verbesina chapmanii, V. heterophylla, Justicia crassifolia, Euphorbia telephoides, Scutellaria floridana, Cuphaea viscosa, etc. has been maintained historically by naturally caused, periodic, and doubtlessly sometimes intense, fire. This burning reduces shrub competition, together with that of grasses and sedges, opens up the overstory of pine thus admitting the light this plant needs. Most of the collections of this plant show remnants of burned bases, and have been made from burned over savanna. Thus prescribed burning would benefit it, as would cutting or thinning an overstory. Tree planting, preceded by such as dozing, root raking, and chopping would have a negative effect. Bedding, in that it leaves a part of the substrate intact, would allow some plants to survive, but subsequent crown closure of planted pine would later shade it out.

This is a plant that never assumes aspect dominance even within the center of its small range, but which is always of scattered occurrence. Thus it easily qualifies as a "sensitive" species whose maintenance will be a challenge.

#### References

- Small, J. K. 1933. Manual of the southeastern flora, p. 1071.
- Woodson, R. E. 1954. The North American species of Asclepias L.,  
Ann. Mo. Bot. Gard. XLI (1): 1-211.

SPECIES: #2 Asclepias viridula Chapm. Milkweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								X
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Asclepias viridula Chapman



ASCLEPIADACEAE

Matelea alabamensis (Vail) Woodson. Alabama milkvine  
Vincetoxicum alabamense Vail  
Cyclodon alabamense (Vail) Small

Technical Description

Perennial, milky-juiced, twining herbaceous vine from a fibrous rootstock.

Stems.-- 1-3 from a stout, erect, fibrous-rooted rhizome, prostrate or twining on shrubs or trees, to several meters long, simple or branching, terete, pale green or tinged with maroon, from nearly smooth to hirtellous, sometimes with a scattering of long, spreading, yellowish trichomes, the newer growth often also with an admixture of short-stalked to sessile, reddish glands.

Leaves.-- Opposite, the petioles stiffly spreading, mostly 3-5 cm long, slender, the upper side somewhat concave, the lower side rounded, the surface yellow-green or maroon, scattered-hirsute, also with a scattering of shorter eglandular and glandular hairs mixed with some sessile glands; blades ovate to suborbicular, 5-10(-15) cm long, apically acuminate or acute, rarely narrowly rounded or even emarginate, entire, the base cordate or auriculate with the sinus narrow or closed, the upper surface deep yellow-green, sparingly to copiously hirtellous, the short, erect hairs swollen-based, the lower surface usually more copiously hirtellous, particularly along the veins, and also along the veins often with sessile or short-stalked glands.

Inflorescence.-- Umbels usually 1/node from the upper nodes, subtended by an involucre of a few, small, lance-linear, hirtellous, green bractlets, on spreading, strongly ribbed, hirtellous and glandular peduncles 1.0-1.5 cm long, the slender rays (pedicels) usually few (mostly 2-5), spreading, slender but stiff, hirtellous and glandular.

Flowers.-- Bisexual, regular, rotate, flattish, ca. 2.5 cm wide across the petals; sepals 5, joined at very base, the triangular lobes spreading, ca. 3 mm long, acute, pale green, hirtellous, also with sessile and stalked glands; corolla lobes 5, spreading, flat, ca. 8-9 mm long, elliptical or narrowly ovate, the tips narrowly rounded, sometimes slightly emarginate, the margins entire, the surface greenish yellow with a reticulum of deeper green, above glabrous, beneath hirtellous and glandular; gynostegium (a weld of stamen and female parts) surrounded at base by a fleshy, orangish disc, this with 5 conical, suberect horns opposite the 5 calyx lobes and forming peripherally a thinnish, irregularly and shallowly 5-lobed, strongly erose fringe; gynostegium elevated above the perianth base ca. 1 mm, yellow-green, the truncate apex ca. 3 mm wide, obscurely pentagonal, nearly covered by 5, thin broadly triangular, inflexed flaps of anther tissue; anther apparatus consisting of 2 saclike pollinia (masses of pollen) connected by a yoke-like pair of arms (translocator) spreading from a lense-like "chitinous" gland (corpusculum) located at the apex of a vertical slit (the interstaminal slit); ovularies 2, superior, connivent to form a single style apically, this expanded distally to form a peltate stigma (most of the gynostegial head!) which is receptive in 5 radial lines beneath

and opposite the glands.

Fruit.-- Follicles yellowish-green, lance-ovoid, muricate, ca. 10 cm long; seeds numerous, flattish, obovate in outline, brownish, erose-margined, bearing a white "coma" of long, thin hairs at the narrow end.

#### Distribution and Flowering Time

Wooded, steep or gradual ravine slopes, Coastal Plain, southwestern Georgia, northwestern Florida, and southeastern Alabama; flowering from late May into June.

#### Special Identifying Features

The above description of the floral structure is adapted from the excellent treatment of southeastern Matelea done by Dr. D. Drapalik (1970), the undisputed authority on these species. Of the 9 taxa found in the south-east only 2 have the corona and coronal appendage tips at a level below the gynostegial head; these 2 are M. alabamensis and M. gonocarpa, which have very different looking flowers, with the strongly reticulate, broader petals of the former in strong contrast to the narrower, not evidently reticulated petals of the latter; the coronal apparatus is entirely different. The ovary and fruit of the former are muricate, those of the latter smooth. Superficially, flowers of M. flavidula are very like those of M. alabamensis, the petals being strongly spreading, flat, similar in outline, yellow green with dark green reticulation as in M. alabamensis and the fruit similar. However the corona and appendages of M. flavidula extend to a level above the gynostegial head.

#### Habitat and Management Implications

M. alabamensis is perhaps one of the rarest herbs in the southeastern U.S., with less than 10 localities ever having been known, and not now found at most of these. Therefore information about precise localities is kept confidential.

The plants, in the one area where they are fairly numerous today, are found on gentle east, south and west slopes in what is, or was, part of a beech-magnolia-maple system. In addition to these the overstory has oaks such as Q. hemisphaerica, Q. nigra, Q. alba, Prunus serotina, Nyssa, Carya cordiformis, C. glabra, Tilia, Liquidambar, with a scattering of Pinus echinata, P. taeda. In the understory are Cornus florida, Ostrya, Carpinus, Prunus umbellata, Rhus copallina, with Vaccinium elliotii, V. arboreum, Sebastiania, Rhus toxicodendron and lianas such as Parthenocissus, Vitis, Rhus radicans, Anisostichus, Campsis are common. The soil is a fine sandy loam and is usually moist, definitely not wet. Such herbs as Hexastylis arifolia, Trillium underwoodii, T. catesbaei, Spigelia, Carex, Polygonatum, Sanguinaria are present. The Matelea vines appear to occupy the edges of the deeper stands of forest or where the trees are well spaced, or where there has been some evidence of recent logging or other disturbance. This appears to agree with information on labels of specimens collected from other localities. It also appears that as such disturbed areas are gradually overgrown by returning woody vegetation the Matelea vines quit flowering, under increasing shade gradually lose vigor, and finally are suppressed entirely.

From this it might be assumed that selective logging of the sort that did little damage to the understory or to the substrate might actually benefit. Controlled light burning might be beneficial. However, these plants are so rare that recommendations for their monitoring and management ought best to come from Dr. Drapalik himself.



## References

- Drapalik, Donald. 1970. A biosystematic study of the genus Matelea in the southeastern United States. Unpublished Ph.D. Thesis, University of North Carolina at Chapel Hill.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1075-1076, Chapel Hill, N.C.
- Vail, Anna M. 1899. Studies in the Asclepiadaceae, Bull. Torr. Bot. Club 26: 423-431.
- \_\_\_\_\_. 1903. Studies in the Asclepiadaceae VII. A new species of Vincetoxicum from Alabama. Bull. Torr. Bot. Club 30: 178-179.
- Woodson, R.E. 1941. The north American Asclepiadaceae I. Perspective of the genera. Ann. Mo. Bot. Gard. 28: 193-244.

SPECIES Matelea alabamensis (Vail) Woodson. Alabama milkvine

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage						X		
No Lasting Effect								
Beneficial if Done Properly	X				X			

plants not used by stock, but can be damaged  
Other Comments: by them.

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Matelea alabamensis (Vail) Woodson





ASCLEPIADACEAE

Mateleia floridana (Vail) Woodson. Florida milkvine.  
Vincetoxicum floridanum Vail  
Odontostephana floridana (Vail) Alexander

Technical Description

Perennial, milky-juiced, herbaceous, twining vine from a stout-rooted rootstock.

Stems.-- Slender, terete, but faintly longitudinally ribbed, prostrate unless there is something to climb on, always a twiner when there is, variable in length, vigorous growth to several meters long, simple or intermittently branched, the surface yellowish-green, but often strongly maroon-tinted, pubescence a mixture of long spreading hairs (hirsute) mixed with short hairs, some of these tipped with red glands.

Leaves.-- Opposite, the petioles stiffly spreading, strongly ribbed, mostly 2-6 cm long, the longest lowest, pubescent as in stems; blades cordiform, ovate to suborbicular, apically acuminate, the margin entire and bristly-ciliate, the base cordate or often auriculate with the sinus narrowly rectangular or closed, the whole blade often to 1.5 dm long but usually much shorter upward on stem; upper surface dark yellow-green, puberulent, sometimes sparsely hirsute along the veins, the lower surface paler, soft puberulent, along the strongly raised veins puberulent and hirsute, with some of the short hairs red-glandular.

Inflorescence.-- A simple, axillary, pedunculate, few-to-many-flowered umbel, the peduncle ca. 1 cm long, slightly shorter than the rays, ribbed, puberulent, maroon-tinted, the pedicels slender, stiffly spreading, mostly 1.0-1.5 cm long, glandular-puberulent, each usually subtended by a narrowly linear, green, hirsute bract ca. 5 mm long.

Flowers.-- Perfect, regular, between 1.0 and 1.5 cm across; sepals 5, 2.5-3.0 mm long, spreading, triangular-ovate, narrowly acute, green or maroon, faintly reticulate-venose, hirtellous; petals 5, spreading, joined at very base, flat, 0.7-1.0 cm long, deep to pale maroon or yellowish-green, narrowly ovate, broadly acute, entire, the backs inequilaterally puberulent, the margins this, a narrow, entire, pale band, the upper surface smooth; crown thin, maroon, broadly low-triangular-lobed, each tip tridentate, each sinus with 2 narrowly triangular teeth; gynostegium flat-topped, low, greenish, the truncate summit 5-obtuse-angled, each interval bearing an inward-projecting, thin, pale scale; ovary superior, bicarpellate, the two ovoid, apically incurved, distinct carpels hidden and developing under the peltate gynostegium and the corona.

Fruit.-- Follicles 2, lance-cylindric, apically attenuated, ca. 7-10 cm long, yellowish when ripe, strongly fleshy-spined; seeds flattish, numerous, ca. 5 mm long, ovate, dark brown, each with a strong tuft of white, silky capillary hairs.

Distribution and Flowering Time

Hammocks, open dry woodlands, northern and central peninsular, rarely panhandle Florida; flowering from late May to July.

## Special Identifying Features

There are no more difficult plants to work with than the asclepiads, in that much of the taxonomy is based on complex floral appendages. The perianth is rather straight forward in most genera, being made up mainly of 5, usually nearly distinct, sepals and of 5, similarly nearly distinct, spreading or incurved petals. Problems come with parts internal to these, first with what is termed "corona" which in *Matelea* is made up of a disc-like, usually thin, outgrowth from the summit of the short corolla tube; this may also involve some tissue from the stamen. Only in a few general (these primitive) are the 5 stamens distinct: instead they are usually adnate to (pressed against) the gynoeceum and produce a short to long columnar truncate-headed structure called a gynostegium (much as in orchids), and in ours the anthers are 2-celled, bilocular, the pollen sticking together in waxy masses (pollinia) in each anther sac, and each anther connected in a stamen by an inverted slender "V" of tissue called the "translocator", the arms of which terminate in a pollinium and are joined by a chitinous, small, usually dark brown zone called "gland". The glands, 5 in number, are usually visible at anthesis at the angles of the gynostegial head at the tips of longitudinal slits in the gynostegium. The gynoeceum is made up of 2 superior ovaries, these joined apically by their styles and at the very stigmatic tips forming most of the truncated, 5-angled surface of the gynostegium. I think that the discussion above indicates what the problem is, in that most of the taxonomy with these plants involves knowing the character, size and appendages of the above-described parts. *Matelea* is distinguished from other viney milkweeds by its bearing a corona at the gynostegial base, this forming 1-2 series, the rims of which are variously toothed or lobed. In fruit these "Bristle-pods" look like milkweeds, usually with but one ovary of a pair ripening. Not all Bristle-pods have bristly ovaries and fruit, thus such species as *M. gonocarpa*, *M. suberosa* may be eliminated from confusion with *M. floridana*, which does. *M. floridana* is distinguished from its nearest relative, *M. carolinensis* (Jacq.) Woods in that it has somewhat smaller flowers, each with an apparently 5-lobed crown, the surfaces of which are predominantly nearly black. The larger flowers of *M. carolinensis* have a 10-lobed crown.

## Habitat and Management Implications

*M. floridana* grows in a variety of wooded habitats which may be quite mesic, as in and around wooded limesink areas or relatively dry, as in open oak-hickory or oak-hickory-pine uplands. The substratum is usually a moist to dryish sandy loam. In the moister "hammock" sites the overstory may be an admixture of *Magnolia grandiflora*, beech, maple, *Liquidambar*, *Quercus* in the willow oak group, water oak, live oak, various hickory, ash, etc., sometimes with cabbage palm admixed, often with palmetto, various *Ilex*, *Cornus*, *Asimina parviflora*, in the understory. In the drier sites the overstory is usually a mixture of longleaf pine, live oak, scrub live oak, deciduous scrub oaks including *Q. laevis*, *Q. margaretta*, *Q. velutina*, *Q. falcata*, etc., and the understory of various heaths, particularly *Vaccinium*, *Gaylussacia*, *Lyonia*, running oaks such as *Q. pumila*, *Q. minima*, saw palmetto, *Zamia*, *Asimina*, etc. Sometimes the sites are dry enough to support large patches of *Chrysobalanus oblongifolius*. Herbaceous associates are often suggestive of dryish savanna woodlands, include wiregrass, various upland *Andropogon*, *Dichanthelium*, *Panicum*, *Polygala incarnata*, *P. polygama*, *Rhynchosia*, *Baptisia*, *Desmodium*, *Lespedeza*, *Stillingia*, *Asclepias tuberosa*, *Amsonia ciliata*, *Paronychia*, many *Asteraceae* including various *Aster*, *Solidago*, *Heterotheca*, *Tetragonatheca*, etc. I have now seen many populations and note (as has the far more experienced Dr. Drapalik, the authority on the genus!) that most of these are largely non-flowering

and that this is where the overstory and understory is most complete in development. The best flowering populations appear to be where there has been recent disturbance, usually involving woods fires or logging or a combination thereof.

Thus, within the rather narrow range of this species, its management would be in line with practice for natural stands of longleaf pine, which is a common overstory species. The mechanical disturbance of the soil involved with most site preparatory techniques would probably have an adverse effect, except where contiguous seeds sources might be available to colonize bare areas. There is considerable risk here, however, in that (as mentioned above) populations are often sterile. Where these milkweeds are in rich hammock, selective logging may create small openings suitable for them; clear cutting would, however, promote weedy understory plants, particularly Pueraria, Lonicera, Smilax, Rubus, which would tend to crowd out these vines.

#### References

- Drapalick, D.J. 1970. A biosystematic study of the genus Matelea in the southeastern United States. Unpublished Ph.D. dissertation, University of North Carolina, Chapel Hill.
- Shinners, L.H. 1964. Texas Asclepiadaceae other than Asclepias. Sida 1 (6): 358-367.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1076-1078. Chapel Hill, N.C.
- Vail, Anna M. 1899. Studies in the Asclepiadaceae. Bull. Torr. Bot. Club 26: 423-431.
- Woodson, R.E. 1941. The North American Asclepiadaceae I. Perspective of the genera. Ann. Mo. Bot. Gard. 28: 193-244.



SPECIES Matelea floridana (Vail) Woods. Florida milkvine

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage		X	X	X				X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Matelea floridana (Vail) Woodson



CONVOLVULACEAE

Bonamia grandiflora (A. Gray) Heller; large-flowered  
bonamia; N.C.N.  
Breweria grandiflora A. Gray

Technical Description

A sprawling perennial herb.

Stems.--Several weak stems to 3 meters long extending outward flat over the sand from a central semiwoody deep rootstock, round in cross-section, short and appressed-hairy with fine, silky hairs.

Leaves.--Numerous, the blades erect or spreading firm, ovate, broadly oblong or obovate, the largest 4-5 cm long, rounded or emarginate, usually short-mucronate, the margins entire, the base usually broadly rounded or cordate, the surfaces appressed-silky-short-hairy, the petioles short, about 3 mm long, densely short-hairy. Smallest stem leaves toward stem base, the largest at about mid-stem, these grading gradually into bracteal leaves which are along the distal 1/2-1/3 of the shoot.

Inflorescence.--Flowers solitary in the bract axils, erect on stiffish, appressed-hairy stalks mostly 1.0-2.5 cm long, these midway with a pair of erect, lanceolate, puberulent bracts around 5 mm long.

Flowers.--Sepals 5, unequal, in 2 series, oblong, narrowly ovate or lanceolate, stiffish, erect, the apex acuminate, the margins entire, the backs pale green and covered with appressed silky hairs, the whole calyx up to 2.0-2.5 cm long. Corolla opening in early morning, closing by early afternoon, funnelform, 7-10 cm long, fully 7-8 cm across the limb, a pale but vivid blue with a paler centre. Stamens 5, alternating with petal midribs, up to 5 cm long, the slender filaments with bases glandular-hairy, the anthers narrowly oblong, yellowish, about 5 mm long. Ovary superior, the style about 4 cm long, branched into 2 slender branches about midway up, each branch terminating in a small, buttonlike stigma.

Fruit.--Capsule broadly ovoid, 1.3-1.5 cm long, with 4 valves, the walls firm but thin. Seeds smoothish, pale brown or greenish brown, 5-8 mm long, oblong, the outer face convex, the inner 2 flat, forming an angle.

Distribution and Flowering Season

Sandy clearings in sandscrub, peninsular Florida. Flowering May to August.

Special Identifying Features

This species is unlike any other southeastern convolvulaceous plant. A sprawler, not a vine, it has flowers fully as large and spectacular and with the same color as the Heavenly Blue Morningglory.

Habitats and Management Implications

B. grandiflora is strictly a sandhills plant, being locally abundant on deep white sands of ancient dunes and sandridges in clearings amongst scrub oaks



(mainly Q. myrtifolia, Q. chapmanii, Q. maritima), Ceratiola, Lyonia, Ilex ambigua, Garberia, palmetto, etc. The overstory, when present, is usually Sand Pine.

Because this a plant of full sun and of dry sandy sites its history is probably one of fire increasing its area through reducing woody competition. Clearcutting of the pine would increase its area, as would mechanical removal of areas of scrub. However, a complete overturning of the sandy substrate such as would be involved in most site preparation on such soils, would temporarily eliminate this species. These artificial clearings would ultimately be occupied by such species as this, providing there were contiguous seed sources but a dense plantation or a natural stand of pine would create too much shade for its maintenance.

#### Reference

Small, J. K. 1933. Manual of the southeastern flora, pp. 1080.

SPECIES: #22 *Bonamia grandiflora* (A. Gray) Heller, N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			NA					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Bonamia grandiflora (Gray) Heller





CONVOLVULACEAE

Cuscuta Harperi Small

Status: Endangered

Technical Description:

Annual parasitic vine, the stems closely twining, filiform, smooth, orangish-yellow, putting down haustoria at frequent intervals, sometimes forming small mats of growth over clumps of host herbs.

Leaves: alternate, few on slender twining stems, usually subtending inflorescences or bracteal, mostly scale-like, narrowly triangular, acute, entire, clasping-based, 0.5-0.6 mm long.

Inflorescence: few-flowered, the 2-5 (-7) flowers either in a subcymose arrangement or in a short raceme, the peduncle mostly an extension of a slender, twining branch and of various lengths, the pedicels mostly 1 mm long or less, sparsely muriculate, sometimes bearing a basal bract.

Flowers: bisexual, regular; calyx broadly and shallowly funnelform, with sepals 3-5 (mostly 4), very thin, pale yellowish-brown, ca. 0.6 mm high, united about 1/2 their length, the lobes broadly low-triangular, the apex obtuseangled, the surface externally scattered-muriculate; corolla short-campanulate, yellowish-white, at anthesis 1.0-1.2 mm high, the lower 1/3 united, the lobes slightly spreading, broadly ovate, the tips narrowly rounded, the blade cupped and incurved; stamens alternating with corolla lobes, arising within the corolla just below the lobe sinuses and above an oblong, fimbriate-margined scale set lower in corolla tube, the filaments erect, ca. 0.5 mm long, linear, slightly tapering, the anthers ca. 0.3 mm long, greenish, broadly ellipsoidal, sub-basifixed, introrse, the narrowly ellipsoidal anther sacs parallel; ovary superior, ovoid, about the length of the calyx, apically indented and with a low annulus, the styles 2, distinct, strongly spreading, the stigmas capitate.

Fruit: capsule broadly ovoid, very thin-walled, translucent, pale-brown, with an irregular dehiscence, at maturity ca. 1.2-1.3 mm high, the divaricate styles persisting, the ovules apical, usually reduced to 1 or 2 seed, the seed light brown, broadly obovoid or nearly round, mostly 1.0-1.2 mm long or broad, brownish, minutely papillate.

Distribution and Flowering Season:

sandrock outcrops, where parasitic on outcrop herbs, Cumberland Plateau and Blue Ridge, mostly northeastern Alabama with possible outliers in northwestern Georgia and southern Alabama; flowering mostly from September to frost.

Special Identifying Features:

The genus Cuscuta is one of the most difficult in a taxonomically difficult family. However, C. harperi is a distinct species of subgenus Grammica, which has the styles distinct to the base and with capitate stigmas. Within Grammica it is part of the complex Cleistogrammica in that its capsules are not circumscissile, but

remain closed until rupturing irregularly. Within Clistogrammica it is distinguished by its extremely slender-stemmed habit, its very tiny flowers (mostly not much exceeding 1 mm in height) which are mostly 4-parted (unlike most others of the complex, in which flowers are 5-parted). The corolla lobes have uniquely inflexed tips. The capsule is broadly ovoid.

#### Habitat and Management Implication:

C. harperi is found mainly in areas of sandstone outcrop and is parasitic on outcrop plants such as Bigelowia nuttallii (Chondrophora virgata), Liatris microcephala, Crotonopsis elliptica, Hypericum gentianoides, all of which are frequent on such outcrops. The outcrops themselves may be small or several acres in irregular extent, with frequent shallow depressions or shallow runoff channells, these rimmed with herbaceous low vegetation dominated by annual grasses such as Aristida dichotoma, A. longispica, Sporobolus, Panicum flexile, Digitaria, interspersed with perennial Andropogon, Panicum, Paspalum, various annual and perennial Cyperus, Fimbristylis, Bulbostylis, succulents such as Opuntia, Talinum, Agave and forbs such as Crotonopsis, Hypericum, Polygonum tenue, and many composites including some rare and local ones such as Coreopsis pulchra, Helianthus longifolius. The commonest composites however are Liatris microcephalus and Bigelowia, the usual hosts for the dodder.

Fortunately the greatest known abundance of this rare dodder is on the outcrops bordering the Little River Canyon in Cherokee, DeKalb and Jackson Counties of Alabama and therefore much of its area is in state ownership. The main danger is to privately owned contiguous areas of outcrop, some of which are part of low-grade pasture with the vegetation badly trampled and grazed. Historically the thin oak-pine forest around the outcrops and the heath dominated shrubby understory of these same areas were periodically subjected to and kept open by natural woods fires. With fire protection for woodlands surrounding the sandstones (or granites in the case of the type locality!) succession onto them may be more rapid than it once was. Cutting of the adjacent oak-pine woodlands may have added potential area.

#### References:

- Small, J.K. 1933. Manual of the southeastern flora, pp. 1092-1094.
- Yuncker, T. G. 1921. Revision of the North American and West Indian species of Cuscuta. Univ. Ill. Biol. Monogr. 6 (2-3): 1-142.

SPECIES: Cuscuta harperi Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy								X
Damage No Lasting Effect	X	NA	NA	NA			NA	
Beneficial if Done Properly					X	X		

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.



Cuscuta harperi Small



POLEMONIACEAE

Phlox bifida Beck ssp. stellaria (Gray) Wherry

P. stellaria Gray

P. bifida var. cedaria Brand

P. bifida var. stellaria (Gray) Wherry

Status: Threatened

Technical Description:

Mat-forming subshrub spreading and rooting from prostrate older shoots, the roots shallow, diffuse-fibrous, save at plant center where deeper, thick and woody, the foliage overwintering.

Stems: several from a root cluster, the older spreading low in all directions, slender, lax, the bases usually prostrate, often rooting at lower nodes, some sterile, functioning as stolons, with internodes crowded and leafy at tips which arch downward to root and form overwintering rosettes, others bolting directly from such rosettes and from nodes of procumbent branches, erect or nearly so, few-noded, mostly 10-15 cm high, slender, floriferous at tip, terete, scattered-short-pilose with whitish hairs, otherwise pale green or tinged with red or pink.

Leaves: opposite, estipulate, those of shoot buds or lowermost on new shoots scale-like, those upward on stems sessile, spreading or erect, often with axillary shoots and thus appearing fascicled, lance-linear, linear, elliptic-linear, (1-) 2-4 (-6) cm long, mostly 1-3 mm wide, the longer ones shorter or longer than the internode subtended, gradually shortening into inflorescence leaves, these usually 1 cm or less long, all narrowly acute, also mucronate or short-spinulose-tipped, the margin entire, sparsely to evenly ciliate or ciliate only proximally, flattish to somewhat revolute, the upper surface gray-green, smooth or sparsely pilose, the lower surface paler, smooth or pilose, particularly along the single, strongly raised vein.

Inflorescence: Numerous branches arising from a mat to form a mass of erect, few-noded stems, each terminating in a few-to-several-flowered cyme, the cyme branches arising from the upper leafy nodes, terminating in a single flower or in cymules of 3, the pedicels slightly shorter or longer than the flowering calyces, erect or arching upward, slender, purplish or reddish-tinged, smooth or with a scattering of minute, spreading, peg-like hairs.

Flowers: Perfect, regular; sepals 5, at anthesis mostly 6-8 cm long, fused, externally smooth or sparsely pilose, the tube tubular, 5-nerved, each nerve bordered by a firm green or reddish-green zone and each bordered nerve alternating with a scarious pale blue or purplish membrane, the calyx lobes narrowly triangular-subulate

ca. 3 mm long, erect or with slightly spreading tips, reddish-green, entire, scarious-bordered below the middle to the membranous, acutish sinus; petals 5, the corolla salverform, from base to narrow mouth 10-15 mm long, the tube very pale blue with tints of yellow, dilating gradually to the tip, the 5 lobes 10-12 mm long, spreading, pale blue, narrowly obovate and deeply split into 2 narrowish lobes to form a short-based "Y", externally and internally smooth; stamens 5, epipetalous, set at different levels at about middle of corolla tube, the yellowish oblong anthers ca. 1.0-1.5 mm long, erect, basifixed, sagittate; ovary superior, smooth, greenish, the slender terminal style producing 3, short-linear, erect, glandular stigmas at or slightly above the level of the anthers. Fruit: Capsule thin-walled, trilocular, broadly ellipsoidal or obovoid, held within the persistent, ascending-lobed calyx, and about as long as the calyx tube; seeds oblong, usually 1/locule, pale brown, smooth.

#### Distribution and Flowering Season:

Calcareous barrens, cliffs, open sandy or gravelly slopes, southern tips of Illinois and Indiana southward, very locally, through Kentucky into northern and central middle Tennessee; flowering from late April into June.

#### Special Identifying Features:

There are several Phlox that are matted subshrubs with needle-like leaves and which produce low masses of bloom. Most are referred to as "Moss-phlox" and several are cultivated. The one commonly grown in the east, according to Wherry (1955) is P. subulata; this has flowering shoots with closer nodes, shorter, more subulate-tipped leaves, thus is much more densely, compactly leafy; while its petals are notched apically, the notch is shallower, at most a long-based "Y" rather than the near "V" of P. bifida, and its corolla limb has a definite, deeper toned "eye". This is the only Moss-phlox to overlap at all the range of P. bifida stellaria. P. bifida stellaria is distinguished from P. bifida bifida in that it has sepals united more than half-way (rather than half-way), the calyx is externally smooth or sparsely hairy (rather than glandular-hairy), the petal notch is slightly shallower. P. bifida proper is found in rocky open areas or open woodlands, sandhills, northward in the Central Lowlands or to the west in the Interior Highlands provinces, and does not contact P. bifida stellaria except at the southwest corner of the range. The taxonomy here is difficult and questionable, and perhaps should be more conservative.

#### Habitat and Management Implication:

My comments here are confined to observations of Tennessee populations only. These appear to be scattered in a few counties of middle Tennessee, though the plant may be an aspect dominant, forming extensive masses of pale blue by early May. These are limestone



appearing either in full sun or in open stands of Juniper or Juniper mixed with upland hardwoods. Climax forest is usually a mixture of Shumard Oak, White Oak, Yellow Oak, Black Walnut, Persimmon, Carolina Hickory, Shagbark Hickory, Bitternut Hickory, Elm, Sassafras, Hackberry and Sugarberry, White Ash, Blue Ash, Sugar Maple and an occasional Beech; disclimax forest is Juniper. Understory shrubs or shrubs of more open areas include Rhus aromatica, Rhamnus caroliniana, Symphoricarpos, with shrubby growth of Cercis, Rhus glabra, R. typhina. Opuntia and Agave are common.

The soil of the open glades is thin, heavy, overlies flat-bedded limestone, usually contains a rubble of limestone chips. It produces a fine array of associated herbaceous species such as Hypoxis hirsuta, Allium (Nothoscordium), Ranunculus fascicularis, Delphinium virescens, Leavenworthia, Petalostemon gattingeri, Psoralea subacaulis, Astragalus tennesseensis, Oenothera triloba, Scutellaria parvula, Blephilia ciliata, Satureja glabella, Lithospermum canescens, Onosmodium molle, etc., many of which are endemic to such glades.

The Phlox is part of a successional stage leading to occupation by shrubs and Juniperus, finally to mixed-mesophytic forest climax, thus it disappears as the open glades close. The main threat to this Phlox in Tennessee comes from urban, residential and industrial expansion, as well as from the damming up of the streams in its area (i.e. Percy Priest Lake, which has flooded the bulk of the best Tennessee populations!).

#### References:

- Small, J.K. 1933. Manual of the southeastern flora, pp. 1101-1105.
- Wherry, E.T. 1955. The genus Phlox. Morris Arboretum Monographs III: 174 pp. Lancaster, Pa.

SPECIES: Phlox bifida Beck ssp. stellaria (Gray) Wherry

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Phlox bifida Beck ssp. stellaria (Gray) Wherry





POLEMONIACEAE

Phlox pulchra Wherry. Wherry's phlox

P. ovata L. var. pulchra Wherry

Technical Description

A perennial smooth herb with short, woody, rather slender rhizomes, and producing both sterile and flowering shoots.

Stems: Shoots mostly 3-6 dm long, erect from short, horizontally bent offshoots, round in cross section, greenish or with purplish tints toward the base, the sterile usually shorter than the flowering ones and often sprawling, remaining green over winter.

Leaves: Opposite, spreading or ascending, smallest and from close-set nodes at the plant base, becoming well separate up the stem (longest are largest toward shoot apex on sterile shoots), from linear to elliptic-linear or oblong or oblanceolate, to 6 cm long and 2 cm broad or slightly more, the blades sessile or on short, clasping-based petioles, narrowly acute or short-acuminate, entire, slightly revolute, the bases narrowly to broadly cuneate, rarely rounded.

Inflorescence: Leaves of flowering shoots reduced in length, the pairs widely separated toward the inflorescence, mostly of a narrowly ovate type. Inflorescence rather compact, a compound of a large terminal cyme and long, upwardly-arching-branched opposite lateral cymes, very showy.

Flowers: Short-stalked, sepals 5, 1.0-1.2 cm long fused below into a narrowly campanulate tube, the lobes linear-lanceolate, erect, acuminate, about 0.7-0.8 cm long, each with a strong, raised midnerve and thin pale margins: corolla trumpet shaped, (salverform) bright pink or white, 3.0-3.5 cm long, the limb spreading, about 2.0-2.5 cm broad, the lobes broadly obovate or suborbicular. Stamens 5, attached to corolla tube at different levels toward its orifice opening, with some anthers at least exerted beyond. Style elongate, the 3 linear stigma lobes projecting slightly beyond the corolla tube.

Fruit: A capsule, this largely enclosed by the persisting, finally spreading calyx.

Distribution and Flowering Season

Sporadic in upland woods and clearings, southwest end of the Appalachian Plateau, mostly north-central Alabama, with outliers in the inner Coastal Plain. Flowering mostly in May and June.

### Special Identifying Features

P. pulchra is very similar to P. ovata, a frequent plant in similar habitats to the northeast in the Appalachians, but differs from it in its longer sterile shoots, its more numerous leaf-bearing nodes, and in its shorter-petioled leaves. Wherry (1955) reports that some examples are pilose (hairy), but this is indeed rare.

### Habitats and Management Implication

This rare species is invariably in acidic situations, usually in open stands of oak-hickory-pine (the pine mostly shortleaf and loblolly, occasionally longleaf) or in oak-hickory, as a rule associated with a shrub understory of heaths (Vaccinium, Lyonia, Gaylussacia, Osydendrum, Epigaea) on well-drained uplands. The soils it is on are usually sandy loams or sandy-clay-loams. It is usually either in thin shade or in small clearings in the forest, its lively pink-flowered forms visible from a distance.

In its Alabama habitat it is most frequent in areas that have been subjected both to considerable logging and also to fire, an indication that it does not decrease with disturbance of this sort. Site preparation involving removal of vegetation through raking, chaining, bulldozing or other mechanical disturbance of the sort that would remove all vegetation preparatory to plantation of pine of course eliminates the species. I have seen no instances of its seeding in to such areas, and no evidence of it either in pine plantations or in grazed woodlands.

### References

Wherry, Edgar T. 1955. The Genus Phlox. Morris Arboretum Monographs III. Philadelphia.

Revised March 1980

SPECIES: #147 Phlox pulchra Wherry. Wherry's phlox

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

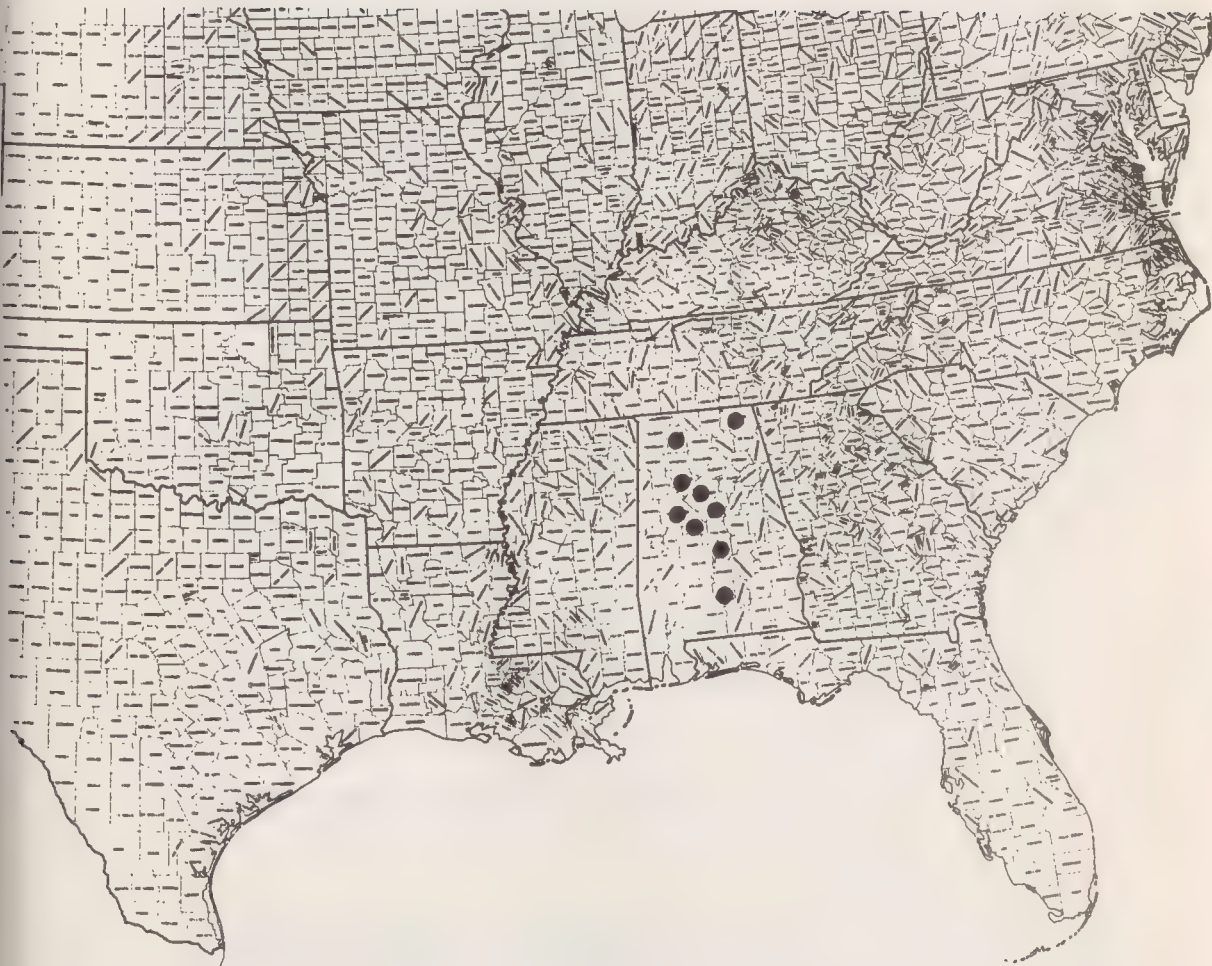
Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



Phlox pulchra Wherry



HYDROPHYLLACEAE

Phacelia dubia (L.) Trelease var. georgiana McVaugh.  
Georgia small-slowered phacelia; scorpionweed

Technical Description

Annual taprooted herbs.

Stems.--The stems solitary and erect or several and spreading-ascending, or erect with several candelabralike branches from near the base, mostly 10-20 (-30) cm long, slender but stiffish, terete, reddish-tinted with stiffish, sharp, short, white, upwardly-directed hairs flattened to the surface mixed with spreading stalked glands.

Leaves.--Basal leaves in a rosette, usually withering by flowering time, distinctly petiolate, odd pinnately compound, 2-4 cm long, with several pairs of leaflets spreading in an oblong pattern, the terminal and uppermost laterals largest, mostly elliptic or obovate, themselves sometimes deeply lobed, the laterals prominently stalked, all surfaces pubescent as in stems; stem leaves mostly erect, alternate, progressively shortening up the stem and becoming sessile, pinnately compound or divided.

Inflorescence.--Flowers in uncoiling terminal racemes, becoming well separate as they mature to fruit on appressed-hairy spreading stalks that elongate to nearly 1 cm. in fruit.

Flowers.--Calyx symmetrical, 2.5-3.0 mm long, the 5 narrowly spatulate or linear lobes nearly erect, separate nearly to the base, greenish, appressed-hairy as in stems. Corolla symmetrical, rotate (shallowly cupshaped), mostly 5-7 mm across, the 5 lobes broadly ovate, rounded, nearly entire, about as long as the tube, pale blue with deeper blue veins, the "eye" near white, externally with a scattering of long whitish hairs, internally smooth. Stamens 5, attached low in corolla alternating with lobes, spreading-erect, the slender filaments 5-7 mm long, pale blue with long spreading white hairs toward base, the anthers oblong, blue, about 1 mm long. Ovary superior, broadly ovoid and shorter than the sepals, with long, erect stiff hairs, the style linear with 2 slender branches about mid-length. Capsule broadly ovoid, 3-4 mm long, stiff-hairy, 2-chambered, the seeds dark brown, irregularly oblong, few, minutely pebbled, or foveate (pitted), angled with flattish interfaces.

Distribution and Flowering Season

On and around granite outcrops, in the Piedmont of Georgia and Alabama. Flowering April and May.

Special Identifying Features

According to McVaugh (1943) this variety has more rosette leaflets (7-13, usually 9-11) than var. dubia (3-7) with the terminal segment not greatly larger than the upper laterals and the lateral segments definitely stalked rather than sessile. The stem-leaves are prevalently oblong, rather than obovate or ovate as in var. dubia.

#### Habitats and Management Implication

Typically the var. georgiana is on thin sandy-silty wash over granite, usually in shallow depressions or cracks. Also it is in the sandy soils surrounding granite or over shallowly underlying granite and frequently extends along sandy road shoulders or fields for several miles around the outcrop areas. It is altogether weedy, often an aspect dominant in such places, always in full sun or very light shade. Its sites, while often moist in winter and spring, invariably become quite dry. Obviously it thrives on the outcrops or in situations that match these, in other words artificial openings in the surrounding oak-pine. Quarrying of the granite is the major threat to this plant, but it will maintain abundantly so long as there are open sandy areas remaining.

#### References

- McVaugh, Rogers. 1943. The vegetation of the granitic flat-rocks of the southeastern United States. *Ecol. Monogr.* 13 (2): 120-166.
- Small, J. K. 1933. *Manual of the southeastern flora*, pp. 1097-1098. Chapel Hill, N.C.



SPECIES: #82 Phacelia dubia (.) Trelease var. georgiana McVaugh. scorpionweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage								X
No Lasting Effect	NA						NA	
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Phacelia dubia (L.) Trel. var. georgiana McVaugh



BORAGINACEAE

Onosmodium molle Michx. Soft-hairy false-gromwell

Technical Description

Taprooted perennial bolting from an overwintering rosette the second season.

Stems.--Solitary or clumped, 5-8 (-10) dm tall, terete, pale yellow-green, strigose and hirsute, stiffly erect or ascending, branching only from mid-stem or above, the branches stiffly ascending, branching only from mid-stem or above, the branches stiffly ascending, then spreading distally.

Leaves.--Rosette and lower stem leaves mostly oblanceolate, often withering by anthesis, the largest 10-20 cm long, those upward on stem becoming much smaller, ascending, often overlapping, spirally arranged, oblong to elliptic or lance-ovate, acute, entire, very firm, the base sessile, rounded or broadly cuneate; leaf surfaces gray-green, the pinnate-arcuate venation strongly raised beneath, the upper surface pale tomentose with upwardly appressed hairs, also often pilose with longer, scattered hairs, the lower surface densely appressed-pale-tomentose, sometimes hirsute on the raised veins.

Inflorescence.--A compound of elongating (indeterminate), strongly bracteate, scorpioid racemes, the bracts grading evenly larger downward on branches to stem leaves, gradually smaller upward in the inflorescence, overlapping, with shape and pubescence similar to that of uppermost foliage leaves, the flowers single in bract axils on ascending, stiff, strigose and pale-tomentose pedicels shorter than the flowers.

Flowers.--Regular, perfect; sepals 5, joined at very base, the lobes erect, linear, ca. 5-7 mm long (lengthened in fruit), green, but paler because of silvery strigose tomentum; petals 5, the gamopetalous corolla tubular-urceolate (narrowly urn-shaped), ca. 1 cm long, the tube gradually dilating to the throat, the 5 greenish, ovate-triangular, villosulous-backed lobes ca. 2.5 mm long, pointing inward around the exerted style, the whole corolla in outline oblanceolate and pale save toward the greenish tips; stamens 5, epipetalous, included in corolla, the anthers longer than the short filaments, oblong-linear, apiculate, basifixed, the filaments arising toward summit of corolla tube; ovary superior, 2-carpellate, deeply 4-lobed, the style strongly elongate, slender, erect, its tip projecting far beyond the corolla lobe tips.

Fruit.--Nutlets per flower 1-4, asymmetrically ovoid or ellipsoidal, 3.0-3.5 mm long, slightly narrowed below to a broad, concave, round basal attachment scar, the surface whitish to grayish or greenish-white, glassy, noticeably pitted.

Distribution and Flowering Season

Limestone glades, prairies, calcareous open woodlands, mostly of juniper, middle Kentucky southward through middle Tennessee into



The Highland Rim of northwestern Alabama; flowering in May and June.

#### Special Identifying Features

This species, while usually in pure populations within its rather narrow range, is sympatric with two others, namely Q. hispidissimum Mack. and Q. subsetosum Mack. & Bush. It differs from the former in its softer (to touch), denser leaf and bract tomentum, in its nutlet bases, which are far less narrowed. It differs from the latter in having a greener, hairier stem (Q. subsetosum has a yellowish, lustrous stem that toward its base is quite smooth). However, the outstanding difference is in the combination of the dense coating of appressed, pale, strigose but softish tomentum of its leaf and bract surfaces with the pale color of the tomentum which gives the plants even from a distance a distinctive pale green aspect.

#### Habitat and Management Implications

Q. molle is calciphilic, preferring the heavy clay soils derived from limestones and dolomites. It may be found in open stands of juniper, or juniper mixed with oak (mostly Quercus shumardii, Q. muhlenbergii, Q. stellata, Q. imbricaria), hickory (mostly Carya carolinae-septentrionalis, C. ovata, C. cordiformis), Ulmus (particularly U. serotina), white ash, blue ash, etc., and with an understory made up of Cercis, Cornus drummondii, Rhus (particularly R. aromatica), Bumelia lycioides, Rhamnus caroliniana, R. lanceolata, etc. In such sites however it can be seen that the Onosmodium is on its way out, being both shaded and crowded out by the woody plants. Its best habitat is in open limestone glades where it roots in the shallow heavy soils overlying the rock, or in depressions or cracks in the rock where some soil has accumulated. Common associated herbs are in the genera Opuntia, Sporobolus, Delphinium, Silphium, Petalostemon (particularly P. gattingeri in Tennessee!), Ratibida (pinnata), Lithospermum (canescens), Viola (often V. egglesonii), Psoralea (subacaulis), Leavenworthia, Senecio, Penstemon calycosus, Phlox (bifida), Verbena (canadensis, simplex), etc., in short, limestone glade herbs, many of which are narrow endemics. These open glades have been maintained historically primarily by natural fires accompanied by erosive forces that would tend to create openings. Such habitat, when left undisturbed, succeeds to junipers, then hardwoods, which ultimately crowd out or shade out the herbs. While the Onosmodium is a coarse herb not much taken by livestock, it vanishes from pastured glades, probably because of trampling by the stock. Removal of the juniper and hardwoods, if unaccompanied by radical soil disturbance, promotes increase of this species. The main threat to the existing

populations, most of which are found in middle Tennessee, comes mainly through the conversion of glades into industrial and residential developments.

#### References

Fernald, M. L. 1950. Gray's manual of botany, ed. 8, pp. 1200-1201. American Book Company.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1126-1127. Chapel Hill, N.C.

Steyermark, J. A. 1963. Flora of Missouri, pp. 1244-1246. Ames, Ia.

SPECIES Onosmodium molle Michx. soft-hairy false-gromwell

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Onosmodium molle Michx.



VERBENACEAE

Verbena maritima Small

Glandularia maritima Small

Status: Threatened

Technical Description:

Perennial from a tap-and-diffuse root system.

Stems: rarely erect, usually several from a short crown, quadrangular, sprawling, leaning, procumbent or repent, rooting from nodes of creeping stems, often to 1 meter long, the internodes many, the branches few to several, strigose and strigillose, with whitish, antrorse hairs, purplish or green, the nodes bristly hairy.

Leaves: opposite, and usually erect from the sprawling or prostrate stems (secund), petiolate, the blades narrowly ovate, cuneate, spathulate, or oblanceolate, mostly 2-5 cm long, the apices broadly rounded to obtuseangled, the margins above mid-blade coarsely serrate, incised-lobed or lacerate, entire and attenuated below to near base of petiole, both surfaces yellow-green, the upper sparsely strigose, the lower smoothish or sparsely hairy along the raised veins.

Inflorescence: A densely floriferous to slightly interrupted, cylindrical spike mostly 2-5 cm long, fully 5 cm broad across the flowers, 1.5-2.0 cm wide across the fruiting calyces, terminal, raised, somewhat above the upper stem leaves of main axis and branches on erect or ascending, stiffish peduncles, the individual flowers each in the axil of an ascending or erect, green, narrowly triangular-subulate, strigose bract ca. 5 mm long.

Flowers: slightly irregular, bisexual; calyx strongly ascending or nearly erect, ca. 1 cm long, the 5 sepals fused into a 5-ribbed narrow tube this green or tinged with purple, strigillose and long-stipitate-glandular, its oblique orifice with 5 somewhat upswept bristly teeth, the lower ones subulate-linear, to ca. 1 mm long, the upper 2 shorter, more broadly triangular-based; corolla gamopetalous, salverform, the slender tube and narrowly campanulate, short throat pilose-tomentose, ca. 2.0 cm long, the spreading limb 1.5-2.0 cm wide, of 5 strong but unequal lobes, the upper 2 broadly cuneate-oblong, the laterals slightly longer, oblong-emarginate, the lowest lobe largest, narrowly obovate, apically very retuse, the limb surface a lively lavender with an orangish-red "eye" above, paler beneath, the tube and throat paler lavender; corolla surface internally scattered pilose in the tube, densely hirsute in the throat, the tips of some of the stiffish hairs exserted; stamens 4, didynamous, 1 pair (fertile) with filaments arising at level slightly above that of the other, these with anthers sessile or nearly so; anthers short-oblong or ellipsoidal, yellow, ca. 1 mm long, the filaments flattish, no longer than the anthers; ovary superior, oblong, the style terminal, narrowly linear, slightly dilated toward apex, the stigma subcapitate, bilobed, 1 lobe triangular, somewhat flattened, the other roundish, glandular.

Fruit: Fruiting calyx tightish around nutlets, the intervals between the 5 ribs thinnish; nutlets 4, ca. 4 mm long, cylindrical, pale brown, all but a narrow ventral groove strongly ridged-reticulate, the areoles more elongated-rectangular toward fruit base.

#### Distribution and Flowering Time:

Sandy clearings, particularly duneswales, in coastal sandscrub and open Live Oak-Cabbage Palm woods along the coast, peninsular Florida; flowering mostly in early spring, but intermittently all year.

#### Special Identifying Features:

V. maritima overlaps in range and habitat only with one other "Glandularia" (V. tampensis, which see!) but that species, which tends to be more abundant on the Gulf coast of Florida, has somewhat larger leaves tending to be more ovate, more regularly toothed, the stems less procumbent or repent, the calyx lobes with longer bristle tips (the longer ones mostly over 1.5 mm long).

#### Habitat and Management Implications:

V. maritima is well named in that it is most abundant in and around open sandy areas close to the present coast of peninsular Florida or along sandy ridges paralleling inlets. Some common herbaceous associates are Uniola paniculata, Panicum amarum, P. amarulum, Eragrostis oxylepis, Cenchrus, Cyperus ligularis, C. retrorsus, Crotalaria pumila, Lupinus, Phaseolus, Tribulus, Ipomoea, Ipomopsis, Monarda punctata, Physalis viscosa. shrubby Solanum, Gaillardia pulchella, Heterotheca subaxillaris. Yucca and Opuntia are common. The dunes scrub surrounding the sandy clearings is heavy in Saw Palmetto, but has abundant representation of Myrica, Persea, Ardisia, Rapanea, Eugenia, Ilex, Smilax, evergreen scrub oaks, this often interspersed with hammocks largely of Cabbage Palm and Live Oak, or stands of Sand Pine mixed with Slash Pine. The sandy clearings in the past were probably maintained through a combination of natural fire and wind, which continues to move shifting sands inward from the beaches.

Much of the original habitat of this species has been lost in the last few decades not so much through the removal of merchantable timber such as Slash Pine as through commercial development, urban expansion, beachfront exploitation. Some areas cleared for these purposes may be colonized by the Verbena along with other sand dune pioneers, but this is a temporary respite. Problems are also arising for such herbs in beach areas of southern Florida because of the unwelcome increase of the introduced and pernicious Australian Pine (Casuarina equisetoides) whose takeover of some sites approaches 100%, and swamping also by the equally bad grass Rhyncholetrum roseum.

#### References:

- Perry, Lily M. 1933. A revision of the north American species of Verbena. Ann. Mo. Bot. Gard. 20 (2): 239-363.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1138-1139.



SPECIES: Verbena maritima Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage								
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Site preparation methods not observed in this area, probably because the land is such expensive real estate.

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Verbena maritima Small



VERBENACEAE

Verbena tampensis Nash. Tampa vervain  
Glandularia tampensis (Nash) Small

Technical Description

Perennial herb from a short shallow rhizome or from short lateral offshoots. Stems.-- Few to several, erect to ascending, but usually decumbent, often rooting from lower nodes, mostly 3-6 dm long, sometimes leaning on other vegetation, quadrangular, sparingly to copiously strigillose from base to inflorescence, usually purplish or purplish-green.

Leaves.-- Opposite, the basal smallest, the largest usually at or about mid-stem, these grading gradually smaller upward to an essentially leafless, variously elongate peduncle; blades mostly ovate, acute, mostly 4-6 cm long, the margin unevenly coarsely serrate, rarely incised-parted below the middle, the base broadly cuneate, then abruptly attenuated, the prominent (1-3 cm) petiole thus wing-margined to near its base; upper leaf surface dark green, strigillose; lower leaf surface paler, strigose along the veins, strigose-puberulent between.

Inflorescence.-- A more or less prominently pedunculate indeterminate bracteate spike, this at first compact, nearly as wide as long, later elongating to as much as 1 dm, with the lower flowers (by then fruit) scattered; bracts linear-lanceolate, coarsely ciliate, strigillose, shorter than the calyx.

Flowers.-- Slightly zygomorphic, bisexual; calyx tubular, ca. 1 cm long, the tube 5-ribbed, greenish, strigillose, the ribs purplish, prolonged to become the midribs of the 5, narrowly triangular-subulate, unequal calyx lobes: corolla slightly zygomorphic, salverform, the pale tube to 1.5 cm long, puberulent, the spreading limb 1.5-1.8 cm broad, the lobes short-oblong or obovate, usually apically notched, the lowest largest, the rim densely coated with short, white, glandular hairs, the upper surface a deep lively lavender, the lower surface pale; stamens 4, diadelphous, attached high in the corolla tube; ovary superior, short-oblong, shallow 4-lobed, the style elongate, linear, shorter than corolla tube, apically dilated into a 2-lobed concave, glandular stigma.

Fruit.-- Of 4 oblong-linear nutlets ca. 4 mm long, toward the rounded apex ridged-reticulate, toward the somewhat broadened base longitudinally ridged, the inner (contact) faces toward apex with fine, white papillae.

Distribution and Flowering Time

Sandy coastal hammocks, clearings, middle and southern peninsular Florida; flowering all year, but mostly March to June.

Special Identifying Features

Some problems exist in distinguishing this from the widespread (extending southward into northern peninsular Florida) V. candensis, and southern peninsular Floridan V. maritima. It is supposed to differ from both in its



shorter corolla tube which is but little (less than 1/2 longer) longer than the calyx, and the tendency for its leaves to be less parted or deeply incised. Its corollas are broader-limbed than is true normally for V. maritima. However, where V. canadensis overlaps in range, there are morphological intermediates, particularly with V. maritima. Even "good" V. tampensis will show some range in length of corolla tube on the same plant, thus the strongest character is perhaps not consistent.

#### Habitat and Management Implications

V. tampensis is a species of well drained sandy clearings or open hammocks, mostly of the cabbage palmetto-live oak type or in slash or longleaf pine-saw palmetto flats, generally not far from the present seacoast or at least along tidally influenced rivers inland. It is often found in disturbed areas, is often in or by recent clearings. Drainage may increase its area; as may soil disturbance to create sandy openings, and its presence in fire-disturbed pinelands would indicate that it is not negatively responding to fire.

#### References

- Long, R.W. and O. Lakela, 1971. A flora of tropical Florida, pp. 740-742. Miami, FLA.
- Perry, L. 1933. A revision of the North American species of Verbena. Ann. Mo. Bot. Gard. 20: 239-363.
- Small, J.K. 1905. Bull. N.Y. Bot. Gard. 3: 436.
- \_\_\_\_\_. 1933. Manual of the southeastern flora, pp. 1128-1129.

SPECIES Verbena tampensis Nash. Tampa vervain

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect	x							
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Verbena tampensis Nash





Paper 88  
Text & map by:  
Robert Kral

LAMIACEAE

Calamintha ashei (Weatherby) Shinnars. Ash's savory; Basil  
Satureja ashei Weatherby  
Clinopodium ashei (Weatherby) Small

Technical Description

Bushy, pungently aromatic shrubs mostly 5 dm tall or less, the 1-several primary shoots from a strong, branched taproot system.

Stems.--The older basal growth with shallowly cracked, pale gray brown bark that peels away in thin strips, the newer shoots numerous, ascending or erect, slender but stiffish, slightly if at all angled, downy with numerous fine short hairs, greenish or greenish-brown.

Leaves.--Of lower older stems absent by flowering time, those of the newer shoots mostly numerous, opposite from nodes 1 cm or thereabouts apart, spreading or erect, linear to narrowly obovate, mostly 1 cm long or somewhat less, acute, the margins entire, strongly revolute, the bases mostly acute or cuneate, the surfaces gray-green with a down of fine hairs, with small glistening glands.

Inflorescence.--Flowers produced oppositely from the axils of all or most upper leaves on ascending, downy hairy stalks about 3 mm long, these with a pair of linear-lanceolate bracts at their bases.

Flowers.--Calyx in flower about 6 mm long, the narrowly campanulate-cylindrical tube dull green, downy, 10-ribbed, about 3 mm long, the limb 2-lipped, the upper lip broadly oblong, maroon, truncately 3-lobed, the lower lip of 2 somewhat longer, narrowly acute, slender tipped, upwardly arching teeth, the rim with a strong tuft of erect, white hairs. Corolla strongly bilabiate, about 1 cm. long, the tube and throat rather slender, 6-7 mm long, whitish to pale lavender-rose, the upper lip short-oblong, projecting slightly upward, rounded-emarginate, lavender-rose, the lower lip projecting downward, 3-lobed with the middle lobe largest, lavender rose toward the tip, toward the base paler with darker mottlings, the corolla surface finely hairy outside. Stamens 4, in 2 lengths of 2, the filaments arching up under the upper corolla lobe but not beyond it, the anthers short-oblong, dark purple.

Fruit.--Nutlets broadly ovoid, nearly round, pale brown, nearly smooth, about 1.5 mm long.

Distribution and Flowering Season

Clearings in sandhills scrub, the Florida central highlands (for lakes country); southeastern Georgia. Flowering intermittently from January to frost.

Special Identifying Features

Most similar to C. dentata, a very rank smelling shrub confined to northwestern Florida and which has broader, somewhat larger, usually cuneate-obovate leaves that have at least some teeth toward the apex.

#### Habitats and Management Implication

This species, while local, may be extremely common where found. In the sandhills around Reidsville, Georgia (where it was reported by Roland Harper early in the Century) it may form masses in open stands of longleaf pine-scrub oak. There it frequently invades abandoned sandy fields or powerline clearings. It may also seed into young plantations of pine, being shaded out later as the crowns close. In peninsular Florida, the area from which it was first described by Weatherby, it is endangered primarily because of housing development and increasing acreages of orange groves.

#### References

- Shinners, L. H. 1962. Calamintha (Labiatae) in the southern United States. Sida 1 (2) 69-75.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1168-1169.

SPECIES: #88 Calamintha Ashei (Weatherby) Shinnery, Basil

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X(shade)	
Damage			X	X				
No Lasting Effect								?
Beneficial if Done Properly	NA	X			X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Calamintha ashei (Weatherb.) Shinnery



LAMIACEAE

Calamintha dentata Chapm.; toothed savory; Basil  
Clinopodium dentatum (Chapm.) Kuntze  
Satureja dentata (Chapm.) Briq.

Technical Description

Pungently aromatic shrubs to 5 dm tall, either simple below or profusely branched even from near the base, usually with dense, full leafy crowns, these frequently as broad as high, and from a woody simple or branched taproot system.

Stems.--Main shoots erect or ascending, gray-brown, the bark thin, cracking, exfoliating, with numerous, opposite, slender but stiffish and brittle, upwardly ascending branchlets, all but the older surfaces dusted with fine short hairs.

Leaves.--Lowest leaves absent by flowering time; leaves of branchlets opposite, spreading or ascending, broadly oblanceolate to obovate, mostly around 1 cm long, the apex rounded and dentate, the margin revolute and low-dentate toward the apex or completely entire, the base broadly to narrowly cuneate, the upper surface yellow-green, dusted with fine gray hairs, gland-dotted, the lower surface paler, prominently dotted with dark glands, the midrib strongly raised and fine-hairy, the petiole very short or absent.

Inflorescence.--Flowers opposite or paired in the axils of most upper leaves, on 2-bracted puberulent stalks to 3 mm long.

Flowers.--Calyx around 6-7 mm long, the tube about 4 mm long, cylindrical, 10-12-ribbed, puberulent and with sessile clear glands, green with tints of maroon on the ribs, with a strong ring of erect white hairs around the rim inside, 2-lipped, the upper lip shorter, upcurved, with 3 triangular, maroon lobes, the lower lip of 2 slender, upcurved, very slender-tipped maroon teeth. Corolla about 15 mm long, strongly bilabiate, the tube and throat narrowly funnel shaped, 7-8 mm long, the upper lip shorter than the lower, oblong, arching forward, the lower lip spreading and directed downward, 3-lobed, the lateral lobes spreading and low, the middle lobe obcordate; outer surface of corolla lavender rose, palest toward the base, all puberulent; inner surface of corolla with upper lip lavender rose and lower lip with a pale median zone, this marked with dark purplish flecks and lines. Stamens 4, of 2 lengths, arching upward under the upper corolla lip, not projecting beyond. Style slender, 2-branched at apex.

Fruit.--Nutlets usually 4, broadly ovoid or nearly round, about 1.5 mm long, brown, nearly smooth.

Distribution and Flowering Season

Deep dry pineland sands, northwestern Florida and southwestern Georgia. Flowering from April to frost.

Habitats and Management Implication

This is perhaps the weediest shrub in the genus, doubtfully threatened within its rather small range. It appears to be equally at home in longleaf pine-deciduous scrub sandhills, dryish longleaf pine flats, sandy open abandoned fields and roadsides, occasionally it is found along the upper edges of ravines forested with beach-magnolia. In such places it has larger, broader leaves and a more slender

habit. Taxonomically it is closest to C. ashei (Weatherby) Shinnery, which has smaller flowers and narrower, more involute, entire leaves.

C. dentata, while most abundant in longleaf pine-turkey oak barrens, appears to maintain itself where there has been clear-cutting or this accompanied by all sorts of site preparation. It is common in slash pine plantations locally within its range, being winnowed out only where the shade and litter become too dense.

#### References

Shinnery, L. H. 1962. Calamintha (Labiatae) in the southern United States.  
Sida 1 (2) 69-75.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1168-1169.



SPECIES: #89 Calamintha dentata Chapm. Basil

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								?
No Lasting Effect		X <sup>x</sup>	NA	X <sup>x</sup>				
Beneficial if Done Properly	NA				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Calamintha dentata Chapm.



LAMIACEAE

Conradina brevifolia Shinn. Short-leaved rosemary

Technical Description

Profusely branched mint-smelling shrub to about 1 meter tall from a diffuse woody root system.

Stems: The bark of older wood gray, thin, peeling in slender short strips. Branchlets numerous, grayish-brown, quadrangular, the angles raised but rounded, the new surfaces canescent (minutely densely puberulent) with pale erect hairs, and toward their tips densely leafy, thus the shrub crowns dense.

Leaves: Opposite, on close-set internodes, spreading, linear, mostly 4-8 mm. long, pale green, fleshy, nearly terete, the backs coarsely glandular and canescent, the lower surface medially grooved with a single strongly raised midnerve, canescent.

Inflorescence: Flowers arising (1-6) from leaf axils of all or most all upper nodes on spreading-ascending slender, greenish-brown, minutely glandular-hairy pedicels 2-4 mm. long, each with a basal pair of linear-spatulate bracteoles ca. 2 mm. long.

Flowers: Calyx tubular, ca. 6 mm. long, the tube 3.5 mm. long to the sinus of the lips, many-ribbed, canescent and gland-dotted, bearing at its apex internally a strong ring of pale bristly hairs, strongly bilabiate, the upper lip broadly low-triangular with 3 low apical teeth, the lower lip longer, of 2 subulate-triangular teeth. Corolla 12-14 mm. long, ca. 7 mm. from base to sinus base, very bilabiate, the upper lip projecting forward and bent upward at its apex, oblong, emarginate, the lower lip bent downward then spreading into 3 lobes, the median largest (2-4 mm. long), obcordate; corolla surfaces minutely pilose, lavender, the lower lip internally toward the middle yellowish-white with spots of purple. Stamens 4, of 2 lengths, the slender flattish white filaments arching upward under the upper corolla lip, 1 pair to just short of its tip, the anthers short, blocky, purplish, the sacs parallel, basifixed. Style slender, forking at the level of the anthers into 2 linear stigmatic lobes.

Distribution and Flowering Season

Sandy flats and sandhills scrub, southern part of Central Highlands of peninsular Florida. Flowering all year.

Special Identifying Features

This is probably the rarest species of Conradina, taxonomically closest to C. canescens, but shorter-leaved and with a smaller middle lobe on the lower corolla lip. It appears to be spatially isolated from the other Conradinas.



#### Habitats and Management Implication

The shrubs are part of a sandhills scrub type common to the lakes country of southern peninsular Florida. Such scrubland is populated by a scattering of Sand Pine, Longleaf Pine and Slash Pine, interspersed with various evergreen scrub oaks, Florida Hickory, Persea, Ilex, etc. In clearings of deep sand appear the Conradina shrubs, these intermingled with bunchgrasses in the genera Andropogon, Panicum, Aristida, Selaginella arenicola, various Polygonella, Garberia, etc. Openings created by clearcutting or fire would tend to increase the shrubs, by reducing or eliminating competing woody vegetation, but subsequent planting to pine would shade them out. The greatest threat to the species is the clearing of the scrub for either housing or orange groves.

#### References

- Shinners, L. H. 1962. Synopsis of Conradina (Labiatae). Sida 1 (2): 84-88.

Revised March 1980

SPECIES: #60 Conradina brevifolia Shinnery, Short-leaved rosemary

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Conradina brevifolia Shinnery





LAMIACEAE

Conradina glabra Shinn. panhandle rosemary

Technical Description

Aromatic, copiously branched, often clonal shrub to 2 meters tall from a woody, diffuse root.

Shoots.--Primary shoots usually several from the woody rootstock, spreading or ascending stiffly, toward base between 1 and 3 cm thick, subterete, the thin outer bark grayish or gray-brown, forming flat, anastomosing (braiding) strips, these often breaking and exfoliating; branchlets abundant, though usually more aggregated toward primary branch tips, slender but stiffish, spreading-ascending, quadrate, light gray-brown or light reddish-brown, minutely gland-dotted, also sometimes minutely and sparsely pilosulous.

Leaves.--Opposite, though appearing fasciculate because of presence of short shoots in axils, persistent, estipulate, linear (very similar to the needles of fir), the longer ones mostly 1.0-1.5 cm long, 1.0-1.5 mm wide, usually slightly and evenly widening from just above a basal constriction to the tip, thus generally linear-oblongate, apically obtuse, marginally strongly revolute, very short-petiolate, 1-nerved, the nerve strongly raised on the lower surface; upper surface deep yellow-green, glandular-punctate, the lower surface paler, minutely strigillose-tomentose.

Inflorescence.--Flowers solitary or (usually) 2 or 3 in spreading cymes from most upper leaf axils, the short (ca. 1 mm) glabrous peduncles apically bibracteate, the bracts green, linear-subulate, ca. 3 mm long, the pedicels slender, smooth, pale green or tinged with maroon, mostly 2-3 mm long.

Flowers.--Perfect, zygomorphic; calyx fused, bilabiate, 6-7 mm long, the tube cylindro-campanulate, ca. 3.5 mm long (to base of deepest sinus), apically pilose-annulate within, the limb bilabiate, the upper lip with 3, slightly upcurved, narrowly triangular, ciliate teeth and slightly shorter than the lower which is deeply cleft to 2 slenderly linear-triangular-subulate, upcurved, ciliate teeth, the calyx body strongly ribbed, gland-dotted, green or maroon-tinged; corolla from base to tip of longest lobe 1.5-2.0 cm long, strongly bilabiate; tube slenderly tubular, ca. 5 mm long, at its apex dilating and bent downward (geniculate) to form a funnelform throat ca. 5 mm long; upper lip oblong, somewhat hooded, arching upward and forward, lower lip flatter, longer, bent downward, strongly 3-lobed, the midlobe most prominent, usually obcordate; surface pilose externally the tube and lower part of the throat near white, deepening to lavender-blue at lobe and lip tips, this interrupted by a pale purple-dotted medial band on the inside of the lower lip; stamens 4, didynamous, paired toward apex of throat just below the lip sinuses, the slender whitish filaments ca. 1 cm long, arching upward under the upper corolla lip and projecting the short, horseshoe-shaped (ca. 0.7 mm long) villous-backed anthers well

beyond the corolla throat, the anther sacs parallel, the connective short, broad; ovary deeply 4-lobed, superior, the slender style exerted beyond the anthers, its tip bifurcated into 2 linear, acute, spreading, purplish-blue stigmas.

Fruit.--Nutlets 4 (usually but 2 perfecting), enclosed in the persistent calyx, broadly rounded-obovoid, slightly longer than 1 mm, pale reddish-brown, the surface faintly raised-reticulate with brown lines.

#### Distribution and Flowering Season

Sandy high pineland, very local, northwest Florida; flowering mainly from March into June, intermittently to frost.

#### Special Identifying Features

The genus Conradina is made up of but five species, all confined to the southeastern area, all shrubby in habit. Two (C. canescens, C. brevifolia) have cinereous-puberulent upper leaf surfaces and persistently puberulent pedicels. Of the three which have smooth upper leaf surfaces, C. glabra has the smoothest calyx tube, the palest corollas, the longest hairs on the anthers, and the most erect habit.

#### Habitat and Management Implications

C. glabra has developed a few, in some cases large, populations on the high sandy land east of the Apalachicola River below the town of Chattahoochee in Liberty County, Florida. Far to the west, in Santa Rosa County near Milton a single collection was made years ago but later efforts to relocate this population have not proved out. The Liberty County land was forested originally by either mixed hardwoods and pine, or by longleaf pine-deciduous scrub oak with occasional live oak in the uplands where the Conradina grew; these areas are deeply dissected by steep sided, densely forested, moist ravines in which presumably the Conradina did not and does not grow except in the ecotones. C. glabra was and is understory in open woodlands or in small clearings therein. Most of its original small area has been heavily logged, particularly for the longleaf pine, or has been cleared for agriculture. Crop farming is mostly poor in this area, but some former habitat is pastured woodland or has been cleared for pasture; in either event, the impact of clearing for crop farming has eliminated suitable habitat and pasturing badly damages the shrubs. The soil is a deep yellow sand, this overlying a conglomerate that has a high clay fraction which itself overlies limestone. In places, where there has been subsidence because of solution of underlying limestone, the

shallow, sandy swales that result, if not wet enough to develop bog vegetation, may support the Conradina. Associate shrub species that might be expected for this type are Chrysobalanus, Vaccinium, running oaks, Rhus toxicodendron, R. copallina, Crataegus, Rubus, Smilax, with dry site herbs such as many Desmodium and Lespedeza, Cassia, Baptisia (lanceolata, lecontei, simplicifolia), Lupinus (L. perennis, villosus), Phlox nivalis, P. floridana, Lithospermum carolinense, Onosmodium virginianum, Berlandiera, many Heterotheca, Aster, Solidago, Liatris, etc., many Andropogon, Aristida, Digitaria, Panicum, Stipa, Sphenopholis, Cenchrus, Bulbostylis, Cyperus (upland species), etc. Much of the Conradina area, after the original harvesting of longleaf pine, has been planted to slash pine. In such cases C. glabra, along with Calamintha dentata, (its common associate) appears to be increasing in the plantation rows, but it may be premature to state that this will be a stable system in that (1.) the site is very poor for slash pine and the growth tends to be more open than may have been intended (2.) the plantations when older may provide more shade and more competition than is good for the Conradina. Since fire has historical in the maintenance of stands of longleaf pine, and Conradina glabra was a part of these original stands, it is reasonable to assume that this shrubby mint is increased, not decreased, in the case of fire. Fire protection to favor the slash pine may be detrimental in the case of this shrubby mint.

#### References

- Gray, T. C. 1965. A monograph of the genus Conradina (Labiatae). Unpublished Ph.D. thesis, Vanderbilt University.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1166-1167. Chapel Hill, N. C.
- Shinners, L. H. 1962. Synopsis of Conradina (Labiatae). Sida 1 (2): 84-88.



SPECIES Conradina glabra Shinnery's<sup>1</sup> panhandle rosemary

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy				X				
Damage		X	X					X
No Lasting Effect					X	X	?	
Beneficial if Done Properly	X							

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Conradina glabra Shinnery



LAMIACEAE

Conradina grandiflora Small. large-flowered rosemary; N.C.N.

Technical Description

Pungently aromatic shrubs mostly 1.0-1.5 meters tall (~2 meters) from rather shallow root systems.

Stems.--Shrub base mostly simple, terete, the bark grayish, thin, the outer layer of braided exfoliating strips; branches few to several, spreading or arching, rebranching irregularly, the shrub crown usually broader than long. Branchlets short to elongate, slender but stiff, brownish or reddish brown, quadrangular, canescent (densely short-hairy) with pale hairs.

Leaves.--Persistent, opposite, linear, needle-like, mostly 1.0-1.5 cm long, spreading, the tips blunt, the margins fleshy-involute, the base acute to a short, reddish, terete petiole, the upper surface gray-green, gland-dotted, short-appressed-hairy, the lower surface densely tomentulose with a somewhat less hairy, raised midrib; all leaves producing in their axils short shoots with leaves of normal length, thus the plants appearing quite whorled-leafy.

Inflorescence.--Flowers produced in short-stalked cymes from the upper leaf axils, the inflorescence thus short-cylindric.

Flowers.--Flowering calyx tubular, 7-8 mm long, bilabiate, the upper lip about 3 mm long, short-oblong, 3-toothed apically, the lower lip of 2, narrow, sharp-tipped, rigid, forward-and-upward arching teeth about 3 mm long, the tube 4-5 mm. long, 10-12-ribbed, greenish with the ribs maroon, puberulent and gland-dotted, the tooth margins ciliate. Corolla mostly fully 2 cm long, the narrow tube bent just above the level of the calyx tube opening, the throat broadly funnel-form, the limb strongly bilabiate, the upper lip arching forward, oblong, emarginate, somewhat shorter than the downwardly arching and spreading, 3-lobed, lower lip which is 9-16 mm long; surface externally pilose-puberulent, that of the tube and throat pale lavender, that of the lips deeper lavender-blue, the lower lobe medially nearly white with strong blotches of deep lavender-blue. Stamens 4, of 2 lengths, arching on long slender smooth filaments up and under the upper corolla lip and projecting the short anthers beyond its tip. Style arching as in the stamens, slender, smooth, forking at its apex into 2 short, spreading lobes. Fruit.--Nutlets nearly round, nearly black, smoothish, the attachment scar basal-lateral.

Distribution and Flowering Season

Sandy flats or sandhills, mostly with sand pine, eastern peninsular Florida from Volusia County southward to Palm Beach County. Flowering all year.

Special Identifying Features

There are but 5 species in this genus, all southeastern, all but 1 considered rare or local. C. grandiflora differs from the others in having the largest flowers, these in cymes of 1-12 on evident stalks.

Habitats and Management Implication

This species is always on deep, fine sands, usually on or in the vicinity of ancient dunes of shores, typically in or around stands of Pinus clausa and ad-



mixed with Lyonia, Ilex, various evergreen scrub oaks, Ceratiola, Polygonella, Opuntia, Saw-palmetto. It responds vigorously to fire, being released in this way from competing shrubs, and from overstory shade. It is an invader of mechanically disturbed sands within its range, but is winnowed out in fully stocked plantations of sand pine. Most of its area is in the coastal dune country along the coast, thus it is endangered primarily through the conversion of these sandhills to housing developments, resort developments, commercial developments, and orange groves.

#### References

Shinners, L. H. 1962. Synopsis of Conradina (Labiatae).  
Sida 1 (2): 84-88.

Small, J. K. 1933, Manual of the southeastern Flora, pp. 1166-1167.

SPECIES: #90 Conradina grandiflora Small. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage								
No Lasting Effect			NA					?
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Conradina grandiflora Small





LAMIACEAE

Conradina verticillata Jennison. whorled-leaved rosemary

Technical Description

Strongly mint-smelling, perennial shrubs, the woody roots producing a mat of sprawling-based branching shoots which often root from the lower nodes.

Stems.--Shoots and branches arch upward, becoming erect, the primary shoots often to 5 dm long, the leafless lower portions with loose, brownish bark, the newer growth slender, quadrangular, the angles prominent but rounded, reddish-brown, the interfaces flat, greenish, the surfaces covered with small, erect or upwardly curved pale hairs. Branchlets leafy from near their bases.

Leaves.--The leaves narrowly linear, spreading or erect, opposite, mostly 2-3 cm long, blunt, somewhat fleshy with strongly revolute margins, narrowing to short, clasping-based petioles; upper surface smooth, gland-dotted; lower surface white-puberulent on either side of a strongly raised, smoothish midnerve.

Inflorescence.--Flowers on short-stalked, linear-bracted, axillary cymes from most or all upper nodes, the cyme stalks hispidulous, the bracts covered with long spreading, gland-tipped hairs. Pedicels spreading or erect, slender but stiff, to 4 mm long, pilose with gland-tipped hairs.

Flowers.--Calyx in flower 6-8 mm long, greenish maroon, tubular-campanulate, strongly ribbed, softly pilose with gland-tipped hairs, the upper lip ca. 3 mm long, its tip upswept and tridentate, the lower lip projecting forward and upward ca. 4 mm long, divided to near its base into two triangular-subulate teeth, the calyx tube at its orifice inside bearing a strong ring of erect whitish hairs. Corolla 2.0-2.5 cm long, bent somewhat upward at the apex of its tube into a funnelform throat, strongly bilabiate, the upper lip about 5 mm long, arching forward, convex backed, oblong, emarginate, the lower lip fully 6-8 mm long, directed downward and spreading into 3 lobes, the median largest, obcordate, the outer surfaces pale to deep lavender, paler toward the base, overall pilose, the inner surface of the mid part of the lower lip nearly white or yellow-white with a flecking of deep purple. Stamens 4, of 2 lengths, arching upward on slender, white, flattened filaments under or slightly beyond the tip of the upper corolla lip, the short anther sacs widely separated by connective. Style elongate, slender, forking at level of anthers.

Fruit.--Nutlets nearly round, dark brown, smoothish, ca. 1 mm long.

Distribution and Flowering Season

Bars, bluffs and banks of streams and rivers, in the Cumberland of Tennessee and Kentucky. Flowering in May and early June.

Special Identifying Features

This species is well separated geographically from the other four described species of Conradina, which are confined to the southeastern Coastal Plain. It is

distinguished taxonomically by its decumbent habit, its longer leaves, its long-glandular-hairy calyx tubes (versus short-hairy or smooth).

#### Habitats and Management Implications

C. verticillata is commonly found on seasonally inundated banks and bars of clear, swift Cumberland streams, extending occasionally inland on sandy loamy ground of wooded, adjacent bluffs. Its woody roots are in sandy silt or sandy silt loams. The shrubs are usually in full sun, intermixed with Hypericum, various grasses and sedges, amongst shrubs such as Viburnum cassinoides, Cornus, Spiraea, bush Hypericum, Itea, etc. The banks and bluffs are typically forested by a mixture of cove hardwoods, eastern hemlock, white pine, shortleaf pine. The sandy substrates have a flora that reflects an at least somewhat acid reaction (ericaceous shrubs are also often associated).

The steepness of the topography, and its rockiness, lessen the usefulness of clear-cutting practice, most of the logging taking place in the area involving removal only of scattered merchantable trees. The greatest hazard to the species appears to be from the damming up of some Cumberland streams (which floods out the large populations of the bars and banks) as well as wholesale clearing for the purpose of putting in resort and retirement housing. Most of the presently known populations of the species are not in State or Federal ownership, which at present vastly heightens the risk of their maintenance. Large areas within the Cumberlands are, or have been, strip-mined for coal, the subsequent degradation of habitat along streams in the area constituting still another threat to C. verticillata.

#### Selected Readings

Shinners, L. H. 1962. Synopsis of Conradina (Labiatae). Sida 1 (2):84-88.

Jennison, H. M. 1933. New species of Conradina from Tennessee. Journ. Elisha Mitchell Soc. 48:268-269.

Small, J. K. 1933. Manual of the southeastern flora, 1166-1167.

Revised March 1980

SPECIES: #61 Conradina verticillata Jennison. whorled-leaved rosemary

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy						X	X	
Damage								
No lasting effect	NA	NA	NA	NA				?
Beneficial if done properly					X			

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



Conradina verticillata Jennison



LAMIACEAE

Dicerandra cornutissima R. Huck

Technical Description

Pungently aromatic low shrubs from woody taproots, the older specimens forming shallowly domeshaped bushy mats.

Shoots.--Bark of old wood dull brown or gray-brown, thin, exfoliating in plates. New shoots, sterile and fertile arising from spreading bases of old shoots, mostly erect or ascending or spreading from decumbent bases, some strictly leafy and usually s shorter than the equally leafy fertile ones, greenish or with tints of maroon, smooth or puberulent at nodes or in inflorescence, quadrangular, the angles rounded, the surfaces gland-dotted.

Leaves.--Opposite, linear, needle-like, mostly ascending, the larger ones mostly 1.5-2.5 cm long, 0.8-1.5 mm wide, firm, apically notched, the margin entire or very slightly wavy, the base nearly sessile.

Inflorescence.--A narrow somewhat interrupted system of numerous axillary short-pedunculate cymes, each cyme with (1-) 2-3 (-5) flowers.

Flowers.--Perfect, bilabiate; calyx ca. 9-10 mm long, asymmetrically cylindrical (the base dilated in fruit) the tube 6-7 mm long, strongly 13-ribbed, green tinged with maroon, the dilated orifice and lobes white with tints of pink, the rim internally with a strong ring of deflexed stiff white hairs, the upper lip slightly shorter than the lower, projecting forward, arching upward at its broadly rounded tip which is made up of 3 very small convergent teeth, the lower lip divided nearly to its base into 2 narrowly triangular-subulate teeth, these projecting forward, curved apically upward; corolla strongly bilabiate, ca. 13 mm long, the tube ca. 6 mm long, there sharply bent below the throat, with limb usually declinate, the upper lip bent upward or reflexed, 5.0-5.5 mm long, the lower lip obovate, ca. 8 mm long, directed downward, the lobes at tips recurved, the surface white, externally puberulent above the tube, internally with upper lip strongly maculate with concentric, trellis pattern, dots and lines of purple, the lower lip with fewer and larger spots medially and proximally. Stamens 4, didynamous, arising near or just above the bend at corolla throat, the slender white filaments forwardly projecting, thus the rounded, white bicornute anthers projected well beyond the corolla tip to about the level of the style tip, the anther horns ca. 1.5 mm long; ovary deeply 4-lobed, the style lineal, elongated, directed up along the roof of the corolla tube, then abruptly bent outward along the roof of the upper corolla lip and exerted well beyond, thence curving slightly downward, its length scattered hirtellous, and terminating in acute, short-excurved stigmas.

Fruit.--Nutlets 4, enclosed in base of persistent calyx, broadly ovoid, ca. 1 mm long, brownish, tumid, with attachment scar oblique at base.

Distribution and Flowering Season

Sand pine and evergreen scrub oak sandhills, Marion and Sumter Counties, northern peninsular Florida; flowering from late August into October.

### Special Identifying Features

This species is very close taxonomically to D. frutescens Shimmers a rare shrub of Highlands County about 100 miles to the south, and might be only varietally distinct. It differs from D. frutescens mainly by being a denser growth, by having more flowers/cymule in a somewhat more compact inflorescence, by having much narrower leaves, and by its smaller, more maculate corollas; its anther horns are slightly longer

### Habitat and Management Implications

D. cornutissima is most abundant in the sand pine-evergreen scrub oak forest type, although it may be scattered in adjacent longleaf pine-turkey oak scrub or on low rises in slash pine-palmetto scrub. Commonest associated woody plants are therefore and pine, scrub live oak, Chapman oak, myrtle-leaved oak, Ceratiola devilwood, scrub holly, Lyonia, Persea (particularly P. humilis), Garberia, Serenoa, smilax species. It thrives in areas where the overstory is fairly open or in small clearings where there are large exposures of sand, this populated by a mixture of sandhills plants in genera Andropogon, Bulbostylis, Cyperus, Aristida, Panicum, Cenchrus, Polygonella, Lechea, Hypericum, Opuntia, Helianthemum, Galactia, Lespedeza, etc. In that it is commonest in areas where the brush and overstory has been burnt or cleared away, and is particularly aggressive along firebreaks and highway rights of way, being at times dominant in such places, it is reasonable to assume that it is a shrub of lower successional levels in the sandhills. However, while locally abundant in Marion County, this shrub is still too local not to be endangered through either residential development or creation of pine plantations.

### References

- Huck, R. B. 1981. A new woody labiate from Florida. *Phytologia* 47 (4): 313-315.
- Kral, R. 1982. Some notes on Dicerandra (Lamiaceae). *Sida* 9 (3): 238-262.
- Shimmers, L.H. 1962. Synopsis of Dicerandra (Labiatae). *Sida* 1 (2): 89-91.



SPECIES Dicerandra cornutissima R.Huck

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		*	*	*			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: \*\*\*Mechanical site preparation on the one hand destroys the shrubs; however, it also creates sandy openings that may be seeded into by contiguous sources.

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

\*\*\*Thus this species will invade mechanically site prepped areas, but will ultimately be shaded out by dense plantings. The best answer is to leave some open areas or lanes.

Dicerandra cornutissima R.Huck



Text & map by:  
Robert Kral

LAMIACEAE

Dicerandra frutescens Shinnars

Technical Description

Dense or straggly low shrub to 5 dm with branches elongate from a deep, stout, spreading-branching taproot, the older branches mostly spreading, even prostrate.

Shoots.--Dimorphic, one type strictly leafy and overwintering, the other developing from latent axillary shoots on the former and floriferous, dying back toward base after fruiting; internodes as in D. immaculata but longer, thus the inflorescence more interrupted.

Leaves.--Larger shoot leaves narrowly oblong-elliptic, linear-elliptic, or linear-oblongate, subsessile, 1.5-2.5 cm long, 2-3 cm wide, flattish but somewhat fleshy, apically narrowly or broadly rounded, entire, not revolute, the upper surface dark green with midrib slightly impressed, the lower surface slightly paler with midrib slightly raised.

Inflorescence.--Elongated, interrupted, with internodes longer than subtending cymes at anthesis, at least one-half of the flowering shoot floriferous and cymules reduced to 1 (-3) flowers, the primary peduncle mostly 1-2 (-3) mm long, the pedicels slender, arching upward, 4-8 mm long, these and peduncles finely puberulent, greenish.

Flowers.--Very irregular, bilabiate, perfect. Calyx at anthesis ca. 9-10 mm long, the body nearly erect, proximally and medially green, distally tinged with red and with a broad white zone around the orifice, liberally gland-dotted, internally with a strong deflexed-hairy annulus, the upper lip broadly rounded, shorter than the lower which is 2.2-2.5 mm long, the sinus between the narrowly triangular-acuminate teeth ca. 1 mm deep, Corolla 1.9-2.0 cm long, with tube erect, ca. 7 mm long, internally villous, bent abruptly at junction with throat sometimes nearly at a right angle or downward, and with palate strongly raised at floor of lower throat between the antherior filaments, the upper lip broadly oblong or ovate, ca. 8-9 mm long, emarginate or retuse, apically usually recurved, the lower lip downcurved, broadly obovate, 9.0-9.5 mm long with lateral lobes oblong, spreading and recurved, the medial lobe emarginate, angling downward or slightly recurved; external surface of throat and limb white or yellowish white, the upper lip marked internally with a trellis pattern of lines and dots of deep purple, the lower lip maculate with larger concentric spots from lobe bases to base of lip. Filaments white, the short pair ca. 12 mm, the longer pair ca. 13 mm long, the anthers long-exserted, purplish, with horns smooth, 0.8-1.0 mm long. Style near white, above the middle hirtellous, bent forward or curved downward beyond and usually above the anthers, the stigmatic branches recurved, subequal.

Fruit.--Nutlets 1-4, enclosed in base of persistent calyx, broadly ovoid, ca. 1 mm long, brownish.



## Distribution and Flowering Season

Sand pine-evergreen scrub oak sandhills, southern part of the Florida Highlands in Highlands County; flowering from August intermittently through winter.

## Special Identifying Features

This shrub is similar to D. cornutissima Huck, another Florida sandhills endemic, differing in being more straggly in growth habit, with leaves tending broader, less revolute, with inflorescence fewer-flowered and more interrupted, with flowers larger and less pigmented with red, with anther horns shorter, and anthers purplish rather than yellowish.

## Habitat and Managment Implications

So far as is yet known this shrubby mint is confined to the sand pine-evergreen oak scrub at the foot of the Florida highlands and lake country. This puts it in the company of a large number of rare plant species such as Paronychia chartacea, Polygonella myriophylla, P. ciliata basiramea, Persea humilis, Prunus geniculata, Lechea cernua, Hypericum cumulicola, Ilex opaca arenicola, Calamintha ashei, Conradina brevifolia, Liatris Ohlinerae and several more that have been listed as threatened or endangered. All are sandhills plants. The herbs and shrubs all represent parts of succession toward a pine-oak-Ceratiola climax which, because of factors such as fire and wind-blown sand, is but scatteringly represented. The dicerandra shrubs are most common where sufficient sandy areas are exposed for regeneration, become increasingly scarce as the more aggressive competing shrubs move in and as the oak-pine overstory develops. This mint could well be the scarcest of south Florida endemics. It was never known outside of the Sebring-Childs area of Highlands County. In that this area is scenic, dotted with lakes of high recreation and fishing value, and has excellent winter climate, much of it has been developed at the expense of the scrub. Where such developments have not occurred as yet they are projected for the near future. Also, these same sandhills have been much effected by citrus culture, thousands of acres having been cleared for groves. Highland Hammock State Park holds some scrubland suitable for this particular species, but as yet it has not been discovered there. This leaves the Archbold Biological Station near Childs, a privately funded station that has perhaps the best high scrubland remaining, and the Dicerandra is on that land. The few populations outside the Archbold holding have a doubtful future.

## References

- Kral, R. 1982. Some notes on Dicerandra (Lamiaceae). Sida 9 (3): 238-262.
- Shinners, L.H. 1962. Synopsis of Dicerandra (Labiatae). Sida 1 (2): 89-91.

SPECIES Dicerandra frutescens Shinnery

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Dicerandra frutescens L.H. Shinnars





LAMIACEAE

Dicerandra immaculata Lakela. Spotless-petaled dicerandra

Technical Description

Aromatic low shrubs from woody taproots; young specimens erect or nearly so, strict or sparingly branched; old specimens producing numerous erect, spreading or ascending shoots from spreading-branched older wood, the whole bush forming a domeshaped mass to 4 dm. high, 5-6 cm. across.

Stems: Bark of old wood gray brown, thin, a system of flattish, loose interbraiding plates; new shoots simple or sparingly ascending-branched, toward the base reddish-brown and smooth, toward the apex green, smooth save for puberulent nodes or even puberulent throughout toward very tips.

Leaves: Opposite, but usually with short leafy shoots making leaves appear whorled, the blades linear, linear-elliptic, linear-oblongate, or narrowly oblong, the longer ones toward the base of new growth mostly 1.5-2.5 cm. long, at most 3.5 mm. broad, acutish with a callused tip, entire, the bases cuneate or attenuate, sessile or nearly so, the midrib or short petiole puberulent, the surfaces otherwise smooth, pale green, densely gland-dotted and with only the midnerve evident. Foliage leaves gradually shortening upward, grading into erect bracteal leaves.

Inflorescence: Flowers produced singly or in 3's from most or all mid and upper axils, forming a narrow system of ascending-stalked erect flowers or small cymes. Flower stalks slender but stiffish, puberulent.

Flowers: Calyx 8-9 mm. long, asymmetrically cylindrical, mostly 10-12-ribbed, bilabiate, the tube longer than the lips, strongly gland-dotted, the upper lip shorter than the lower, its broadly rounded apex made up of 3, narrow, short, sharp, converging lobes, the lower lip of 2, narrow, sharp-pointed, upwardly arching teeth; calyx surface toward base pale green, upwardly with maroon or purple tints and toward the tip white or pink, bearing within at the tube apex a strong ring of whitish hairs. Corolla strongly bilabiate, about 1.5-2.0 cm. long, the lips about as long as the tube and throat; corolla tube white, narrowly tubular, expanding into a broadly funnel-shaped throat; upper lip broadly oblong, retuse, projecting forward, the back rounded; lower lip directed downward, 3-lobed, the laterals spreading sideward, the median lobe largest and retuse; corolla surface externally white at the level of the tube, the throat and lips lavender-rose or purplish or rarely white, spotless, and with throat and lips white-puberulent. Stamens 4, of 2 lengths, the slender, violet filaments projecting the anthers beyond the corolla tips, the divergent anther sacs purplish each with a very slender, spreading minutely puberulent horn. Style slender, exerted, its forked tip projecting beyond the stamens.

Fruit: Nutlets 4, nearly round, about 1 mm. long, nearly smooth, pale brown.

Distribution and Flowering Season

Fine sands of ancient dunes near the coast, southeastern peninsular Florida (St. Lucie and Indian River counties); flowering in September, October.

### Habitat and Management Implication

This recently discovered and rare species is found in light shade of, or clearings in, sand scrub. The dominant trees are Sand Pine, various evergreen scrub oak (mostly Q. virginiana, Q. chapmanii, Q. myrtifolia), Florida Hickory, with admixtures of Ximinea, Serenoa, Bumelia, Lyonia, etc. It may be in direct association in sandy clearings with Opuntia, various bunchgrasses in genera Panicum, Aristida, Andropogon, Digitaria, pinweeds, jointweeds, and the rare Conradina grandiflora. While it is most often in evergreen scrub, it may be also found along the ecotone to longleaf pine-turkey oak, and in any case is always on deep sands and often where there are expanses of bare sands. These bare sands are probably created through a combination of wind action and/or fire. In that the growth of this species is most luxuriant in full sunlight, less so and more scraggly in the shade of the Sand Pine and other tree species, it would appear that it is shaded out as the overstory of trees and other scrub increases. Areas of disturbed sandy soils in the vicinity of its few existing populations show no evidence of reoccupancy by this Dicerandra, which appears to have few (if any) weedy tendencies.

The greatest threat at present to this species is in the rapid expansion of the many small residential and commercial communities that are springing up on the line of ancient sand dunes between Vero Beach and Ft. Pierce. Because of this the species is near extinction.

### Reference

- Lakela, Olga. 1963. Dicerandra immaculata Lakela, sp. nov. (Labiatae).  
Sida 1 (3): 184-185.

Revised March 1980

SPECIES: #63 Dicerandra immaculata Lakela, Spotless-petaled dicerandra

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy			X	X			X	
Damage								
No Lasting Effect		?						?
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



Dicerandra immaculata O. Lakela



LAMIACEAE

Dicerandra odoratissima Harper. Rose dicerandra; N.C.N.

Technical Description

Strongly aromatic annual herb to 4 dm tall from a taproot that is often thickened by gall formation.

Stems.--Erect, simple or branching from near the base from all or most of the main nodes and thus producing a bushy crown; lower part of stem brownish with thin, exfoliating bark, nearly terete, becoming upwardly quadrangular, reddish-tinted, scabrous or puberulent with stoutish, incurved short pale hairs, and also gland-dotted.

Leaves.--Opposite, evenly distributed along the stem, erect, spreading or recurved, often with axillary leafy short shoots; leaf blades narrowly linear, (the lowermost, preflowering ones may be broader), to 4 cm long, blunt, the margins scabrid, fleshy, strongly inrolled, the bases nearly sessile, the surfaces above scabrid, greenish or maroon tinted, gland-dotted, medially grooved, beneath paler, smoothish or puberulent, strongly gland-dotted, with a single strongly raised median, scabrid vein. Largest leaves toward base, gradually narrowing and shortening upward into the inflorescence.

Inflorescence.--Flowers single or in few-flowered, nearly sessile cymes from leaf axils mostly from midstem upward, in colorful "liatrislike" cylindrical systems. Flower stalks shorter than the calyxes, spreading-ascending, maroon with a strong dusting of short whitened hairs.

Flowers.--Calyx cylindrical, around 8 mm long in flower, strongly 12-ribbed, greenish with the ribs maroon, or strongly maroon tinted, bilabiate, the upper lip 1.5-2.0 mm long, arching slightly upward, low-triangular, ciliate, the lower lip about 3 mm long, cleft nearly to its base to form 2 very narrowly triangular, subulate, stiffish teeth that project forward, curve slightly upward; calyx tube surface strongly gland-dotted between the ribs, otherwise smooth, the nerves appressed-puberulent, the tooth edges ciliate, the tube orifice thin bearing within a ring of whitish, erect hairs (an annulus), and externally whitened or rose. Corolla strongly bilabiate, 2.0-2.5 cm long, the tube and throat narrowly funnelform, about 1.5 cm long, lavender-rose or somewhat paler toward the base, the upper lip oblong-ovate, arching forward, about 5 mm long, its tip rounded or slightly emarginate or with 3 low, rounded teeth, its back keeled, short-hairy, the lower directed downward, 7-8 mm long, strongly 3-lobed, the lobes obovate, the lateral ones slightly shorter and rounded, the median emarginate; outer corolla surfaces a bright lavender-rose, softly puberulent externally, the lower lip lined within with yellowish or paler lines, also freckled with dark purplish spots. Stamens 4, on slender filaments arising from near the throat apex, arching upward under the upper corolla lip, the anthers concealed just below its tip; anthers nearly round, each with a prominent spur. style slender, elongate, projecting upward under the upper corolla lip with the stamens, its tip short pubescent, 2-branched.

Fruit.--Nutlets nearly round, about 1 mm long, pale to deep brown, nearly smooth or minutely pitted.

### Distribution and Flowering Season

Local in sandhills in the lower Coastal Plain, eastern South Carolina southward to southeastern Georgia. Flowering from September to frost.

### Special Identifying Features

There are but six species of Dicerandra, all in the southeastern United States. Three are shrubs restricted to Florida. This, together with the remaining 2 is annual, and distinguished from the other annuals by the fact that its stamens do not project beyond the upper corolla lip, by its much longer lower calyx lip which is divided nearly to the base, and by its non-geniculate corolla.

### Habitats and Management Implication

All the Dicerandra are plants of deep, nearly pure sands. This species is always in pine (longleaf and slash), usually on sand ridges sandy fields, or sandy rises in or bluffs along rivers. It is a plant of light shade or full sun. It readily invades such disturbed areas as dryish sites prepared for pines, abandoned sandy fields, roadsides, etc. Fire (not recommended as a management tool for sandhills but a natural factor there!) increases it by decreasing competing shrubs (scrub oak, Ceratiola, Persea, Calamintha) and grass-sedge competition, as well as the shade of the pine or oak-pine overstory. The plants, as mentioned above, come in strongly after any site preparation involving exposure of the sands; however, they disappear as the pines establish and close crowns.

### References

Shinners, L. H. 1962. Synopsis of Dicerandra (Labiatae).  
Sida 1(2): 89-91.

Small, J. K. 1933. Manual of the Southeastern Flora, pp. 1169-1170. Chapel Hill, N.C.



SPECIES: #91 Dicerandra odoratissima Harper. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect			NA					?
Beneficial if Done Properly	X	X			X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Dicerandra odoratissima Harper



LAMIACEAE

Hedeoma graveolens Chapm. Mock pennyroyal  
Stachydeoma graveolens (Chapm.) Small

Technical Description

Perennial aromatic shrubby herbs from a short, caudex-like crown and either a branched taproot or diffuse system of rather stout primary roots.

Stems: Shoots usually numerous, from rather strict to copiously branched at least toward the base, the primary shoots mostly decumbent-based, all leafless toward the base, nearly round in cross section, smoothish with a thin, dull brown or gray brown bark, the newer growth and branches mostly erect or ascending, slender but stiffish, pale brown to dull green, or maroon, densely puberulent with a mixture of gland-tipped hairs and flattened, blunt, scale-like hairs, and upwardly also hirsute, with the upper growth usually concealed by overlapping leaves.

Leaves: Numerous, opposite, the pairs more distant proximally on the stem, overlapping and gradually smaller toward the stem tip, mostly ovate, the larger mostly ovate, rarely oblong, sessile 1 cm. or less long, acute, revolute, the margin coarsely low-serrate, crenate or entire, dark yellow-green sometimes with tints of purple, the surfaces with glistening sessile glands and minute stalked glands, usually (particularly upper leaves) hirsute, particularly toward and along the margins.

Inflorescence: Flowers solitary or few in the axils of all or most median and upper leaves, the short, (2-3 mm.) erect glandular-puberulent stalks mostly hidden by leaves.

Flowers: Calyces ascending or horizontal, campanulate-cylindric, about 5 mm. long, strongly ribbed, gland-dotted and glandular-puberulent, also hirsute, strongly bilabiate with the lips about equalling the tube, the upper lip short-oblong with 3 triangular acute lobes, slightly shorter than the lower lip, this cleft near to the base into 2 forward-and-upward-arching, narrowly triangular, subulate, hirsute teeth and bearing a ring of hairs within at the orifice. Corolla about 1 cm. long, the narrowly tubular base expanding level with the calyx lip sinuses into a funnelform throat, distinctly bilabiate, the upper lip oblong, emarginate, arching forward with its back rounded, the lower lip bent downward and flaring into 3 lobes, the laterals spreading downward, the median largest, broadest and 2-lobed apically: surfaces puberulent, the throat and lobes purplish, the lower lip medially with a strong yellowish-white band, this mottled with dark purple. Fertile stamens 2, accompanied by 2 minute stamodia, the fertile filaments attached to either side just below the lip sinuses, arching under the upper lip with the anthers projected just beyond; anther sacs short-oblong, nearly parallel. Style slender, elongate, its tip coiled under the upper lip of the corolla.

Fruit: Nutlets nearly round, about 0.5 mm. long.



### Distribution and Flowering Season

Low sand ridges, pine-palmetto flatwoods, edges of bay swamps, northwestern Florida; flowering May into September.

### Special Identifying Features

There are but 2 shrubby Hedeoma in the southeastern area, this and H. drummondii Benth., a western species which enters our area only in the Black Belt and which has much narrower, often petiolate, leaves.

### Habitats and Management Implication

H. graveolens is rooted in sands or sandy peats of lower parts of Longleaf Pine-Turkey oak sandridges, in Longleaf-Slash Pine-Wiregrass-Saw Palmetto-Gallberry, or sandy margins of bayswamps, usually in association with a variety of savanna grasses and sedges, composites, and various shrubby heaths. It is most abundant where there has been a recent history of fire, and appears to diminish in numbers and luxuriance where fire is absent for extended periods. It may invade pine plantations as these open up with age, as their soils stabilize, or if these are burned.

### References

- Chapman, A. W. 1878. An enumeration of some plants chiefly from the semi-tropical regions of Florida. Bot. Gaz 3: 2-6, 9-13, 17-21.
- Godfrey, R. K. Personal Communication, Sept. 1976.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1165-1166.

Revised March 1980

SPECIES: #64 Hedeoma graveolens Chapm. Mock pennyroyal

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage		X	X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Hedeoma graveolens Chapman





LAMIACEAE

Macbridea alba Chapm. White birds-in-a-nest

Technical Description

Stiffish, erect, odorless perennial to 1 meter tall.

Stems: Simple or sparingly branched above, quadrangular, toward the base purplish, upwardly greenish, smooth or variously pilose.

Leaves: Opposite, rather well spaced, spreading-ascending, the lowermost longest and persistent, oblanceolate or spatulate, to 10 cm. long, 1-2 cm. broad, the tips rounded or obtuse, the margins distantly low-toothed, sinuate or entire, the bases attenuate or narrowly cuneate, running narrowly down the petiole to a clasping base, the surface smooth or pilose, pale green, gland-dotted; leaves gradually reduced in size up the stem, the upper ones sessile, often linear-oblong.

Inflorescence: A short, almost head-like spike, this solitary and terminal on a stiff peduncle projecting well above tips of uppermost leaves, or sometimes plants also producing spikes from axillary ascending branches from some lower nodes. Bracts imbricated, ovate to obovate, 1 cm. long, rounded, the inner smaller, sessile glandular, these concealing the flower bases.

Flowers: Calyx narrowly obovoid, about 1 cm. long, strongly bilabiate, green, gland-dotted, 3-lobed, the lobes slightly shorter than the narrowly campanulate tube and of equal length but the upper more narrowly oblong, all bluntish. Corollas spreading outward from bract summits, forming showy clusters, snow white, fully 3 cm. long, the narrow tubes expanding gradually into swollen, narrowly funnelform throats, these longer than the lips; upper corolla lip short-oblong, rounded, shallowly hood-like, projecting forward; lower lip directed downward, 3-lobed, with laterals narrowly oblong, spreading, the longer median broadest, all rounded. Stamens 4, in 2 different lengths, the flattened filaments with loose cottony hairs, arising low in the corolla, arching and ascending into the upper corolla lip to near its tip; anther sacs strongly diverging, with cottony hairs on their backs, the anther valve edges toothed minutely. Style slender, projecting slightly beyond the longest stamens, the 2 short, recurved lobes unequal.

Fruit: Nutlets narrowly obovoid, brown, to 4 mm. long.

Distribution and Flowering Season

Sandy peats of savanna-bogs in the pine-palmetto flatwoods of northwestern Florida; flowering May into July.

### Special Identifying Features

There are but two species of Macbridea, both of the Coastal Plain of the Southeast. The other species, M. pulchra Ell., has elliptic to linear-elliptic or lanceolate, thinner leaf blades with wingless petioles, and has rose-purple corollas.

### Habitats and Management Implication

M. alba is a plant of high hydroperiod soils, usually black sandy peats. Usually it is a part of fire savanna in Longleaf Pine, Slash Pine-Gallberry-Myrica-Saw Palmetto or in the lower reaches of Longleaf Pine-Wiregrass. Typically it is in grass-sedge bog formations created by flatwoods fires, and is in association with several other endangered species such as Verbesina chapmanii, Justicia crassifolia, Scutellaria floridana, Cuphea aspera, etc. None of these species persist where drainage is perfected and fire is kept out, though they may be increased by clearcutting. Mechanical site preparation reduces or eliminates them, and even bedding presents but a temporary solution in that the plants persisting in the pine rows are shaded out when crowns of plantation pines close.

### References

- Chapman, A. W. 1897. Macbridea, in Flora of the southern states, 3rd Ed. p. 387.  
Small, J. K. 1933. Manual of the southeastern Flora, p. 115.

Revised March 1980

SPECIES: #65 Macbridea alba Chapm. White birds-in-a-nest

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



Macbridea alba Chapman



LAMIACEAE

Monarda stipitoglandulosa Waterfall

Status: Threatened?

Technical Description:

Perennial, aromatic, 2-10 dm tall, from shallow, elongate rhizomes, the roots slender, fibrous, diffuse.

Stems: Erect, usually unbranched below the middle from a short-decumbent base, quadrate, the angles being broad, rounded ribs, the intervals flat or concave, the internodes short and numerous toward stem base, lengthening upward, in the upper 1/5 developing arching-ascending, opposite branches, these usually terminating in inflorescences; stem surface yellow-green or strongly suffused with purple, smooth save distally where minutely incurled-puberulent with pale hairs.

Leaves: opposite, spreading or ascending, the lower ones gone by flowering time, those at mid-stem slightly the largest, gradually reduced to just below the inflorescence, the petioles mostly 1-2 cm long, slender, troughed above, overall minutely spreading puberulent and remotely sessile-gland-dotted, the larger blades mostly lanceolate, 6-8 cm long, narrowly acute, rather evenly low-serrate, the margin very slightly revolute-thickened, the base broadly cuneate to rounded-oblique, the upper surface a deep yellow-green, minutely puberulent, with a scattering of lepidote glands, the lower surface much paler, strongly gland-dotted, minutely puberulent, the hairs slightly longer and particularly dense on the midrib and lateral veins; venation pinnate, the midrib impressed above, strongly raised beneath.

Inflorescence: an involucrate head, the dense floral mass exclusive of corolla hemisphaerical, 2.0-2.5 cm across the base and ca. 1.5 cm high, subtended by a few flat spirals of leafy involucre bracts these spreading or somewhat reflexed, lanceolate to ovate, mostly 1.5-2.0 cm long, the tips acuminate, sometimes short-aristate, the margins entire and ciliate, the broadly cuneate or narrowly rounded base subsessile, the upper surface often pale, cinereous-puberulent, the lower surface darker, similarly puberulent, many of the hairs above and below with minute glands; outer bracts grading into a few series of somewhat shorter, upcurvate, lance-linear bracts, these strongly awn-tipped, hirsute-ciliate and also minutely stipitate-glandular-puberulent, these hairs sometimes intermixed with stouter, peg-like gland-tipped hairs.

Flowers: bisexual, with a regular calyx and a strongly irregular corolla; sepals 5, the tube cylindric, 8-9 mm long, 10-ribbed, pale green dotted with sessile orangish resin glands and minutely stipitate-glandular, at its orifice and for 1-2 mm below the rim inside strongly villous-pilose with inward pointed white hairs, the calyx lobes subulate, awn-like, 1.0-1.5 mm long, erect or slightly spreading at anthesis, sparsely bedecked with coarse, spreading peglike stipitate glands; corolla bilabiate, white, ca. 3 cm long, the narrowly funnelform-tubular base falciform-excurvate, 1.0-1.2 cm long, the upper lip arching forward in line with the tube, narrowly linear, somewhat folded, its narrowly rounded apex fimbriate-villous with long white hairs, the lower lip broader, oblong, about the same length as the upper and downcurvate, also folded, apically with lateral lobes low, broadly rounded into a central, oblong-linear lobe ca. 3 mm long, this



somewhat fimbriate at tip; external surface white-pilose, dotted with amber sessile glands; stamens 2, epipetalous, the slender, flattened tapering white filaments arising just below the corolla sinuses and arching upward and forward to just under the tip of the upper corolla lip or just beyond, there converging (connivent) the anther connective much flattened and broadened, forming a "T" with the filament apex, the anther sacs linear, divergent 180 degrees, parallel to those of opposing anther; ovary superior, lobed at insertion of style base, the style slenderly linear, arching upward and under the upper corolla lobe, its unequally bifid stigmatic apex projecting just beyond the anthers.

Fruit: nutlets 4, oblong-cylindric, 1.3-1.8 mm long, smooth, brown.

#### Distribution and Flowering Season:

Dry, openly wooded ridges and ravine slopes or moist, rocky, gravelly moist clearings along streams and rivers, inner Coastal Plain and Interior Highlands, eastern Oklahoma and southwestern Arkansas; flowering from late May well into July.

#### Special Identifying Features:

This Bee-balm is most similar to M. fistulosa, the commonest and most wide-ranging as well as most polymorphic species. It differs from that species in a more prevalently white corolla, in the minutely stipitate-glandular indumentum of calyx tube, bractlets and sometimes bracts. Waterfall's original description calls for a much lower plant than may be observed on moister, lower sites such as are found for it in western Arkansas. Also, while the Waterfall description indicates only a white corolla, M. stipitoglandulosa may develop clones in which corollas are very light lavender.

#### Habitat and Management Implications:

M. stipitoglandulosa frequents upland, comparatively dry, shaley or shaley-sandy woods and ravine slopes where the overstory is comprised mainly of oaks and hickories such as Quercus stellata, Q. velutina, Q. coccinea, Q. marilandica, Carya tomentosa, C. texana, together with Pinus echinata. However, the plants are also found downslope in gravelly sandy clay of clearings in or streambanks through mixed mesophytic woodland. Its tolerance to wide fluctuations in soil water appears to be high, and its substrate requirements are very similar to those of Streptanthus squamiformis Goodman, a frequent associate. Like that species, it may come into areas where clearcutting and various methods of mechanical site preparation have been employed.

#### References:

Waterfall, U.T. 1970. Monarda stipitoglandulosa, a new species from Oklahoma. Rhodora 72 (792): 502-504.



SPECIES: Monarda stipitoglandulosa U.T.Waterfall

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy							X	
Damage								X
No Lasting Effect	X	X	X	X				
Beneficial if Done Properly					X	X		

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Monarda stipitoglandulosa Waterfall



LAMIACEAE

Physostegia leptophylla Small

Dracocephalum leptophyllum Small

Status: Threatened

Technical Description:

Smooth, perennial, non-aromatic mint, mostly 7-15 dm tall from a stocky, fleshy caudex, this terminating a slender pale rhizome which produces also whiplike, stoloniferous rhizomes surficially.

Stems: Stiffly erect, simple, usually if branching, branching only in the inflorescence, quadrate, at base 4-8 mm thick, the angles rounded, toward base with nodes close set, at mid-stem and upward distant, the surface proximally and distally often purplish, otherwise pale green, in the inflorescence minutely puberulent.

Leaves: opposite, simple, the lowermost usually absent by anthesis, those at mid-stem usually largest, only the lower ones petiolate, the petioles mostly 3-6 cm long, slender, troughed above, often reddish, the blades mostly lanceolate to elliptic or oblanceolate, erect or ascending, 6-10 cm long, obtuse to bluntly acute, the margin sinuate to low-serrate, the low teeth very ascending, each with a low, callused apiculus, the base attenuate, the surfaces yellow-green (when dry showing a clear pattern of short-oblong cystoliths), pinnate-veined with only midrib above appearing strong, beneath with midrib strongly raised, the lateral veins arcuate, faint but raised; blades upward on stem progressively shorter, narrower, sharper-pointed, more sessile, more distant, grading into bracteal ones 1 cm or less long.

Inflorescence: terminal, indeterminate, either a single spikelike raceme or with an additional pair of racemes, in outline lanceolate, the flowers crowded and overlapping toward its tip, more distant downward as flowers become fruit, the pedicels stiffly ascending, each subtended by a lance-subulate bract shorter than the calyx and pedicel combined, the pedicel at anthesis puberulous, 1.0-1.5 mm long.

Flowers: bisexual, spreading-ascending, the calyx nearly regular, the corolla strongly bilabiate; sepals 5, united, the tube at anthesis narrowly campanulate, from base to lobe-sinus 5-6 mm long, the lobes triangular, sharp-tipped, spreading-ascending, 2-3 mm long, the surface puberulent externally, green as in leaves but with lobe tips often reddish-tinged; petals 5, strongly united and bilabiate, 2.5-3.0 cm long, the tubular base dilating above the lower 1/3 to become broadly funnel-form with the upper (posterior) side slightly arched or nearly straight, the lower (anterior) side more convex and inflated, the limb of 2 lips, the upper slightly longer, ca. 3-6 mm long, from broadly rounded or truncated tip to sinus, but narrower, arched forward and slightly folded, the lower lip 3-lobed, apically slightly downcurved, the central lobe oblong and emarginate, the laterals shorter, salient, rounded or slightly emarginate, the external surface lavender-rose with deeper lines at throat apex and lips, grading paler toward the tubular base, the upper side puberulent, the lateral and lower sides smooth, internally purple-mottled in throat, smooth throughout; functional stamens 4, didynamous, the slender, flattened filaments epipetalous,



arching upward and just under the upper corolla lip, the anthers externally deep purple, dorsifixed, the strongly divergent, reniform anther sacs spinulose-toothed along the slits and presented either just below tip of upper corolla lip or slightly beyond; ovary superior, 4-lobed, bicarpellate, the slender style slightly curved upward with the filaments, the 2, short-linear, excurved, sharp stigmas presented just beyond the upper corolla lip.

Fruit: Nutlets 4, nearly round in outline but often 3-angled, pale brown, smooth, ca. 2.5 mm long.

Distribution and Flowering Season: Swamp woodlands, river and inlet banks and coastal sloughs, Coastal Plain, southeastern Virginia south to northern peninsular Florida, westward into southern Alabama; flowering mostly in May and June, intermittently to August.

#### Special Identifying Features:

The difficulty with Physostegia is that it is such a distinct genus, meaning that the several taxa are within complexes hard to tell apart. Nearest to P. leptophylla is probably P. purpurea (Walt.) Blake, of wet savanna or swamp woodland in the Atlantic Coastal Plain south into southern Florida. This tends to have the larger leaves more crowded toward the base, rather than at mid-stem or above, and broadest toward the apex and the pubescence of its calyx and inflorescence is, while short, heavier and sharper. Dr. Philip D. Cantino, current revisor of the genus for North America, doubtless knows additional characters, but, from the material I have seen in the field and in the herbarium, there appear to be several intergrading forms.

#### Habitat and Management Implication:

D. leptophylla is a species primarily of swamp woodlands, particularly where the alluvium overlies calcareous rock or in areas where the streams and rivers empty through broad coastal sawgrass marsh. The substrate is usually a sandy peat muck or sandy silt and, save in driest periods, is saturated. The plants are strongly clonalizing, forming large, showy stands either in full shade or full sun as would be beating on hammock edges, along banks and islands in rivers, or in sweet marsh at edges of sawgrass. The overstory species in the swamp forest are mostly Bald Cypress, Water Tupelo (N. aquatica or N. ogeche), Carolina Ash, Red Maple, Sweet Gum, Willow, Water Hickory, Sugarberry, Elm, various swamp oaks, particularly willow oaks. Sabal palmetto is common in most Florida sites. The shrub layer normally has an abundance of Myrica, Cornus ("Svida"), Styrax americana, Ilex, Sabal minor, tangles of Smilax, Rosa, Itea, Crataegus, etc. Common associated herbs include Sagittaria, Sparganium, Peltandra, Pontederia, Isoetes, Saururus, Polygonum, Penthorum, Proserpinaca, Asclepias (particularly A. perennis), Cicuta, Eryngium yuccifolium, synchaetum, Hydrolea, etc. Chasmanthium nitidum is a common associated grass and frequent sedges are Scirpus fontinalis, S. divaricatus, Rhynchospora corniculata, R. mixta, R. miliacea, Carex lupulina, C. joorii.

P. leptophylla is impacted primarily by real estate development along

some streams as well as by an increasing conversion of large tracts of swampy hammck to slash pine plantations. This last usually involves a wholesale mechanical site preparation preceded by clear cutting and deep drainage-ditching. These activities cause excessive silting of the small streams, burying of habitat, and in addition creation of habitat too dry for swamp herbs.

Reference:

Small, J.K. 1933. Manual of the southeastern flora, p. 1156.

SPECIES: Physostegia leptophylla Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X	X	X			X	
Damage	NA					X		X
No Lasting Effect					X			
Beneficial if Done Properly								

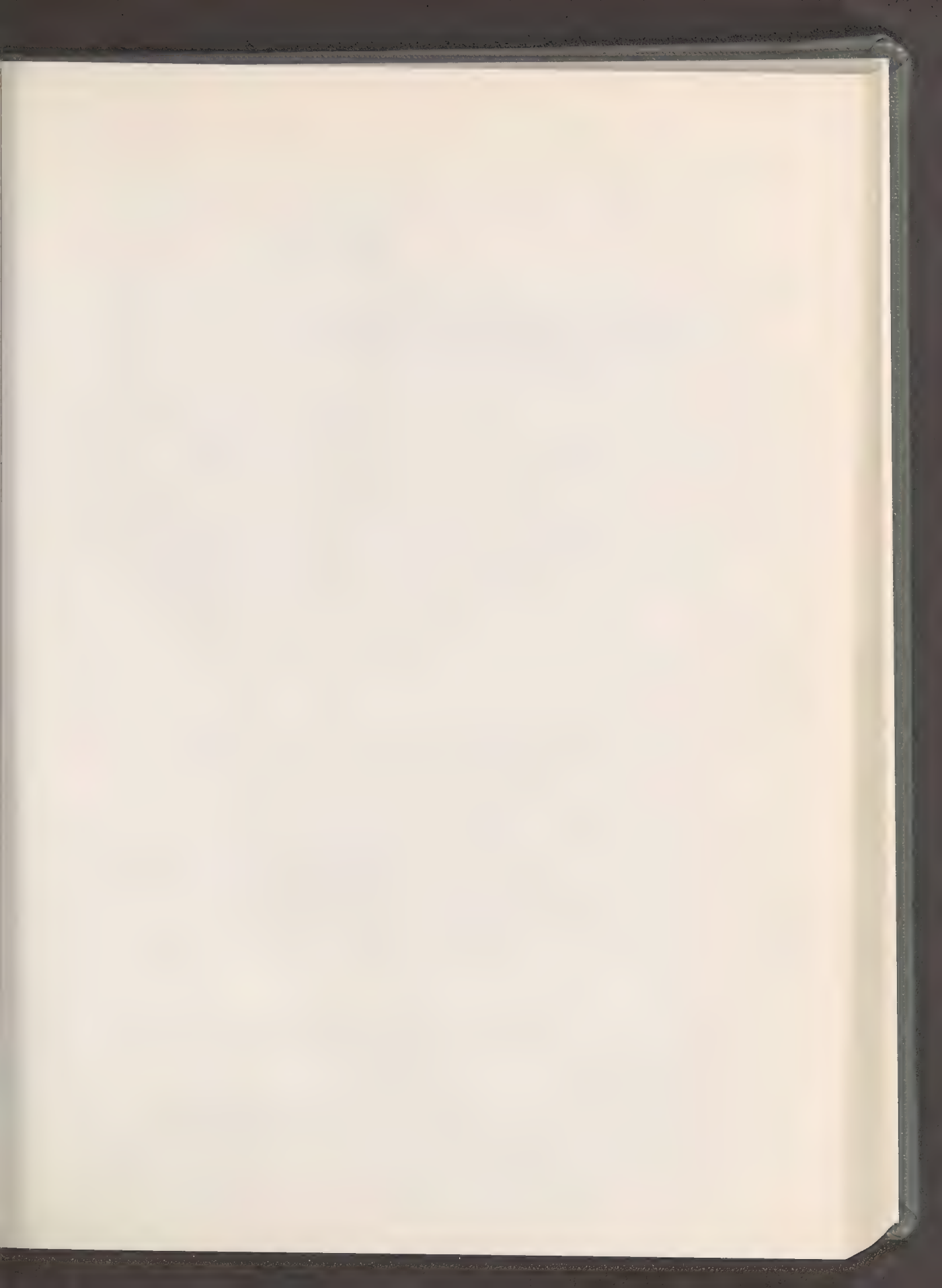
Other Comments: Drainage destroys the habitat!

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.



Physostegia leptophylla Small





LAMIACEAE

Physostegia veroniciformis Small. Veronica dragon-head; false dragon-head or obedient plant  
Dracocephalum veroniciformis Small

Technical Description

Perennial herbs mostly 6-8 cm tall, from stout, erect or ascending, simple or forking rhizomes.

Stems.--Solitary or few, stiffly erect or ascending, yet slender, quadrangular with the angles rounded, the interfaces flat or concave, toward base smooth, pale green, toward the tips, spreading puberulent and tinted with maroon.

Leaves.--Opposite, on widely separated nodes, ascending or erect, the basal ones long-petiolate, the blades elliptic or lanceolate, those toward midstem nearly sessile, spatulate or oblanceolate, mostly 3-4 cm long, the apex blunt, the margins entire to sinuate or saliently low-toothed with teeth distant and toward the blade apex, somewhat revolute, the base narrowly cuneate or attenuate, nearly sessile, the surfaces pale yellow-green, smooth, minutely dotted, the upper surface grooved along the midrib, the lower surface with midrib strongly raised: leaves gradually diminishing in size upward becoming completely sessile, lanceolate, grading into lanceolate inflorescence bracts less than 1 cm long.

Inflorescence.--Flowers born in open, erect, spikelike racemes (internodes elongate during and after flowering), ascending on spreading-puberulent stalks 2 mm or less long.

Flowers.--Calyx in flower tubular-narrowly funnelform 5-6 mm long, the tube longer than the 5, triangular, short-acuminata nearly equal teeth, the surface externally greenish with tints of maroon, spreading puberulent. Corolla very bilabiate, slightly less than 2 cm long, the tube pale, tubular, 5-6 mm long, expanding into a broadly funnelform throat 6-7 mm long, the upper lip broadly obovate, about 3 mm long, projecting forward and slightly upward, its back slightly keeled, the lower lip directed downward, 3 lobed, the laterals spreading, short-oblong, round tipped, the middle longest, oblong, emarginate; surface of throat and lips externally lavender rose, puberulent, lined with deeper purple veins, the inner surface of the lower lip longitudinally lined and dotted with deep purple (pollination guides). Stamens 4, of 2 lengths, epipetalous, the filaments curving upward under the upper corolla lip, the anthers short, dark, nearly round; style elongate, curving upward with the stamens and about as long, slightly forked apically.

Fruit.--Nutlets 2 mm long, ovate, smooth, brownish, the outer face convex, the inner 2 faces concave.

Distribution and Flowering Season

Hillside bogs, ditches, seeps, wet open pinelands, southern Georgia southwestward to northern and northwestern Florida. Flowering May into July.

Special Identifying Features

This has the smallest flowers of the southeastern species of Physostegia, the corolla being less than 2 cm long (the other species have corollas over 2 cm long),



the calyx proportionately smaller. The plants are also smaller than are the other species.

#### Habitats and Management Implication

Optimum habitat for P. veroniciformis consists of high hydroperiod, mucky, sphagnum bogs where it mingles with pitcher plants, sundews, butterworts, various eriocauls, Xyris, sedges and grasses, usually in full sunlight or light shade, often in clearings of wax myrtle, Magnolia, Persea, Nyssa (ogechie, biflora), Pinkneya, etc. The most important overstory species would be Pinus palustris, P. serotina, P. elliottii. Clear cutting would effect it little, perhaps increase it, providing this is not accompanied by mechanical site preparation or drainage, which in either case would eliminate this plant. As is true of most pineland bog forbs, it is increased by burning of competing shrub, tree, or grass competition. It is now being reduced over its range mainly by conversion to drained plantations of pine (which first dries the habitat, later shades it) or improved pasture which usually also involves drainage.

#### Reference

- Small, J. K. 1903. Flora of the Southeastern United States, pp. 1028 - 1337. New York
- \_\_\_\_\_. 1933. Manual of the southeastern flora, pp. 1156. Chapel Hill, N.C.

SPECIES: #92 Physostegia veroniciformis Small False Dragon-head or Obedient plant

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Physostegia veroniciformis Small





LAMIACEAE

Pycnanthemum curvipes (Greene) Grant & Epling. Tennessee mountain-mint  
Koellia curvipes Greene  
K. multiflora Small

Technical Description

Stiffish, aromatic perennial herbs from coarse rhizomes or a knotty rootstock, also producing slender pale stoloniferous rhizomes from rootstocks and stem bases.

Stems.-- Erect, solitary or few, to 1.5 meters tall, quadrangular save at very base, the lower stem with reddish-brown, thin bark, usually smooth but sometimes canescent-puberulent, toward the middle and above densely canescent-puberulent with whitish, incurved hairs, rarely mixed with a few longer, spreading hairs.

Leaves.-- Opposite, the lowermost usually absent by flowering time, the largest at mid-stem or lower, the blades mostly ovate to ovate-lanceolate, mostly 3-6 cm long, acute, the margins subentire to low-serrate, the base mostly broadly rounded, less often broadly cuneate, the upper surface pale yellow-green, gland-dotted, smooth or nearly so (becoming hairier in the inflorescence), the lower surface whitened with pale, incurved trichomes, the petioles 5-15, mostly 8 mm long, spreading, densely pale puberulent.

Inflorescence.-- Flowers grouped into small cymes, these intermingled with small, linear, canescent bracts, the cymules grouped into dense, hemispherical cymes, these usually terminal and solitary but sometimes in vigorous growth produced also from the next node beneath; all leaves of inflorescence branches similar in shape to main stem leaves but smaller, with upper surfaces whitened.

Flowers.-- Zygomorphic, complete. Calyx 3.0-3.0 mm long, short-cylindric, externally densely white-puberulent, the 5 teeth nearly equal, triangular, the lower 2 longest (comprising the lower calyx tip), ca. 1 mm long, the upper divided nearly to base, all tooth tips short-acuminate or mucronate, often slightly recurved; corolla bilabiate, externally puberulent, the tube ca. 2.5-3.5 mm long, the upper lip erect, 1.5-3.5 mm long; corolla surface pale lavender, the lips spotted with deep purple.

Fruit.-- Nutlets usually 4, oblong, brown, 1.2-1.4 mm long, the rounded tips hairy.

Distribution and Flowering Season

Dryish, upland woods and clearings or outcrops, in the Southern Appalachians from western North Carolina southward into the Piedmont of Georgia, west of the mountains from middle Tennessee southward through eastern Alabama to the upper Coastal Plain. Flowering from July through August.

Special Identifying Features

This "species" is hardly distinguishable from P. albescens, a plant of similar

sites whose distribution centers in the Gulf Coastal Plain from eastern Texas eastward into northern Florida and inland into Oklahoma and Arkansas. Only the most minor characteristics, such as leaves tending to be rounded at base (instead of cuneate), pubescence of upper stem tending to be consistently incurled-puberulent (rather than often having longer, spreading hairs admixed), calyx teeth broader, shorter, abruptly acuminate with tips tending to recurve, the upper divided nearly to base (rather than narrower and longer, less abruptly acuminate, usually acute, with tips erect, the upper more fused). Actually, inspection of a fairly large series of specimens of P. albescens, there are specimens which have a mix of characteristics of P. curvipes, P. albescens, and the closely related P. incanum. The limits of species in this complex are not yet defined clearly.

#### Habitat and Management Implications

The habitat of P. curvipes is variable. It may be found at edges of upland woods or in open oak-hickory or oak-pine woods on sandy loams, sandy clay loams, or clay loams. Also it may be found on shallow soil pockets on outcrops of shale, phyllite, or granite (the type locality is Stone Mountain, Georgia). The site is in any event sunny and dry. Plants of this complex of Pycnanthemum exhibit weedy characteristics, rather rapidly occupying abandoned clearings, succeeding in areas where there is fire and/or logging disturbance. Succession to closed-canopy forest, or closure of crowns of plantation pine, would eliminate the species by shading it out.

#### References

- Grant, E. and C. Epling. 1943. A study of Pycnanthemum (Labiatae) Univ. of Calif. Publ. Bot. 20 (3). 195-240.
- Greene, E.L. 1911. P. curvipes in Leaf. Bot. Obs. and Crit. 2: 140.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1171-1175. Chapel Hill, N.C.

SPECIES Pycnanthemum curvipes (Greene) Grant & Epling.

Tennessee mountain-mint

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect		X	X	X				
Beneficial if Done Properly	X				X	X		

Other Comments: effects of grazing not observed

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Pycnanthemum curvipes (Greene) Grant & Epling



Paper 93  
Text & map by:  
Robert Kral

LAMIACEAE

Pycnanthemum floridanum Nash ex Grant & Epling. Florida  
mountain-mint; mountain-mint  
Pycnanthemum floridanum Nash (Nash 2259, nom. nud.)

Technical Description

Powerfully aromatic perennial from a short stout caudex and several shallow, spreading stout and long-tapering roots, increasing by means of shallow or surface creeping, slender, stolons.

Stems.--Usually solitary, erect, sometimes to fully 2 meters tall, profusely upwardly arching-branched above, the lowest part woody, sometimes to 1 cm thick, the bark thin, reddish-brown, smooth, breaking and peeling, above becoming quadrangular, yellow-green, with short downcurved hairs along the angles, the interfaces flat, smoothish to hirsute and puberulent, more densely so toward branch and shoot tips.

Leaves.--Lowest leaves absent by flowering time, the largest at about mid-stem, opposite in numerous pairs, spreading, ovate or lanceolate, on hirsutulous short (usually under 4 mm long) petioles, the tips short acuminate or acute, the margins ascending-toothed (coarsely low-serrate), the bases acute, rounded or broadly cuneate, both surfaces green and sparingly hirsute to smooth, hirsute along the veins beneath, both surfaces copiously gland-dotted. Leaves gradually getting smaller, more sessile, upward toward the inflorescence, their upper surfaces whitened by dense tomentum, as are those of the bracts and bractlets.

Inflorescences.--Made up of dense clusters of short-stalked, bracted cymes, these clusters axillary to the uppermost pairs of bracteal leaves, hemispherical in outline, broader than high, about 2 cm across. Lowermost bracts of flower clusters narrowly ovate, those subtending flowers narrower, all densely tomentose-puberulent with a scattering of pale longer hairs, the whole inflorescence therefore appearing pale gray-green.

Flowers.--Flowering calyx cylindric or narrowly funnelform 4.0-4.5 mm long, the 5, triangular-acuminate teeth approximately equal (through the calyx rim is oblique), around 1 mm long, the calyx surface gland dotted and also densely appressed puberulent and hirsute externally. Corolla 4-5 mm long, strongly bilabiate, the short tube broadening into a longer, funnelform throat, the upper lip short-oblong, projecting forward, its back rounded, its apex rounded, shallowly emarginate, the lower lip directed downward, 3-lobed, the lobes rounded; corolla surface hirsutulous externally, pale lavender to near white, the lower lip mottled with purplish blotches. Stamens 4, in 2 lengths but nearly equal, the filaments arching upward under the upper corolla lip. Style elongate, slender, slightly forking at the apex.

Distribution and Flowering Season

Pine-palmetto flatwoods, pineland savannas, middle and northern peninsular Florida; flowering July and August.

### Special Identifying Features

This species resembles P. muticum vegetatively, particularly in regard to the nearly smooth lower leaves and in general appearance of the plant. In its calyx (of subequal members) it is most similar to P. incanum. Where this writer has collected it there appeared no other Pycnanthemum species mixed with it.

### Habitats and Management Implication

The habitat of P. floridanum varies from quite wet swales or ditches in pine flatwoods and open rangeland to open shrub-grass sedge-pine savanna, the soil being usually a black sandy peat. The overstory is usually a dotting of slash pine, pond pine, longleaf pine or a mixture of the three with a shrub understory of gallberry, Lyonia, Myrica, Saw-palmetto. The plants may appear abundantly in interspersed clearings of grass-sedge, and distinct because of their tendency to form large clones, the very whitened upper surfaces of their upper leaves making them visible from a considerable distance.

Clear cutting would increase the species in that it reduces shade. All methods of site preparation save bedding would reduce it. Drainage would eliminate it. It is part of a complex of shrubs and herbs which is maintained through fire, thus fire as a management tool would probably increase it. Such plants as I have seen in pastures do not appear to be browsed by livestock, the main damage to them being by trampling.

### References

- Grant, Elizabeth and Carl Epling, 1943. A study of Pycnanthemum (Labiatae).  
University of California Publications in Botany 20(3): 195-240.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1171-1175. Chapel Hill, N.C.



SPECIES: #93 Pycnanthemum floridanum Nash ex Grant & Epling Mountain-mint

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Pycnanthemum floridanum Nash  
ex Grant & Epling



LAMIACEAE

Scutellaria floridana Chapm. Florida skullcap;  
skullcaps or helmet-flowers

Technical Description

Perennial, odorless herb at most to 4 dm. tall from a forking system of fleshy but slender, yellowish rhizomes these at intervals developing fascicles of swollen-linear unbranched storage roots.

Stems.--Solitary or few, mostly erect or ascending, simple or sparingly and oppositely branched, quadrangular, the angles rounded and firm, low-scabrid, the interfaces flat or concave, mostly smooth, purplish toward the base, greenish upward.

Leaves.--Opposite, distant on internodes longer than themselves, erect or somewhat spreading, the largest at about mid-stem, linear, 2-4 cm long, narrowing to blunt, callused, purplish tips, the margins strongly inrolled (revolute), the bases sessile or nearly so, acute, the blade surface strongly gland dotted, pale yellow green, only the mid-nerve evident as a shallow groove above, strongly raised beneath, the upper surface smooth or minutely scabrid.

Inflorescence.--Flowers well separated, solitary in the axils of bracteal leaves that are short-linear (mostly 1 cm or less long), in variously elongate terminal racemes. Flower stalks 5 mm long or less, somewhat spreading-ascending, puberulent, rigid.

Flowers.--Calyx expanding in fruit, in flower about 4 mm long, campanulate, shallowly 2-lobed, bearing on its upper side near the apex a "cap" or "scutellum", the outer surface greenish with tinges or maroon or purple, gland-dotted, also minutely puberulent. Corolla fully 2.5 cm long, strongly bilabiate, the short tube bearing within an oblique annulus (ring of hairs) and there bent upward into a funnelform throat about 1 cm long; upper corolla lip arching forward, strongly keeled, 3-lobed with the median lobe longest, short-oblong, retuse, the laterals shorter, projecting forward and spreading outward, rounded; lower lip directed somewhat downward and spreading, broadly ovate, emarginate, wavy margined; corolla surface a bright lavender-blue, the throat beneath whitish, the inner face of the lower lip with a prominent white median patch that is mottled with deep lavender-blue flecks and guidelines. Stamens 4, of 2 distinct lengths, their filaments arching upward under the upper corolla lip but not beyond, the short anthers with their backs long-bristly-hairy. Style elongate-curved as in the filaments but longer and projecting beyond the corolla to curve downward at the forked tip.

Fruit.--Nutlets nearly round, about 1.5 mm long, dark brown, strongly pebbled (muricate).

Distribution and Flowering Season

Pine-palmetto flatwoods, savannas, northwest Florida in Franklin, Liberty and Gulf Counties; flowering May, June.

Special Identifying Features

This is the rarest of the southeastern Scutellaria, being extremely local within its small range. It is most similar to narrow leaved forms of S. integrifolia



and to S. glabriuscula. However it is a smoother plant and all its leaves in addition to being either scale-like or linear, are entire and are usually shorter than either of those two species.

#### Habitats and Management Implication

A typical habitat for this species would be the nearly black, humus enriched, high hydroperiod sands of the lower coastal plain terraces around Apalachicola or not far inland. The overstory is usually a dotting of slash and longleaf pine, the shrub understory mainly a mixture of palmetto, gallberry, Lyonia, Myrica, The Scutellaria grows in grass-sedge dominated clearings that are maintained in this type by periodic burns, often in association with other endangered species such as Verbesina chapmanii, Justicia angustifolia, Aclepias viridiflora, Euphorbia telephoides, Macbridea alba, Cuphaea aspera, etc.

Present land management policy within the range of this plant clearly is reducing the species. Some of the range has been cleared for improved pasture. This usually means drainage, which eliminates the Scutellaria even before the introduced Bermuda or Pensacola grass crowds it out. Or, it means clearcutting of the pine, site preparation involving drainage, mechanical site preparation (the least objectionable method involving bedding) and establishment of plantations of pine. Eventually the Scutellaria and most associated species are either lost through drying of the habitat or through the dense shade of the pines. The plants appear to hold over vegetatively for long periods in the rough under stands of large pine, abundantly sprouting and blooming shortly after these areas are burned. It is simply another species which is a part of fire maintained pineland savanna. Unless management practice in the area is changed this plant will completely disappear.

#### References

- Epling, Carl. 1942. The American species of Scutellaria. Univ. Calif. Publ. in Bot. 20 (1): 1-146.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1149-1153. Chapel Hill, N.C.

SPECIES: #94 *Scutellaria floridana* Chapm.; Skullcap or Helmet-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Scutellaria floridana Chapman





LAMIACEAE

Scutellaria montana Chapm. Large flowered skull cap  
skullcap or helmet-flower

Technical Description

Perennial, odorless, at most to 6 dm tall, from a short erect caudex, from which arise numerous thickish, simple, primary roots.

Stems.--Erect or ascending, quadrangular, the faces rather soft, pale green, spreading-pilose with whitish, often gland-tipped, hairs.

Leaves.--Lowermost stem leaves usually smallest, long petiolate, the blades triangular-ovate; median or uppermost stem leaves largest, spreading on shorter, wing-edged petioles, the blades 6-10 cm long, elliptic or ovate acute or acuminate, coarsely serrate, the bases attenuated gradually or abruptly into the petiole wings; leaf surfaces dark green above with scattered, appressed, weak hairs, paler and soft-appressed hairy beneath, pilose along the raised veins.

Inflorescence.--Flowers few to several, opposite in terminal, often leafy-bracted, racemes. Flower stalks spreading, slender but stiffish, pilose, up to 5 mm long, the lowermost stalks subtended by petiolate, leafy bracts, the uppermost with bracts smaller but still longer than the flower stalks.

Flowers.--Calyx in flower campanulate, greenish, about 4 mm long, 2-lobed with a "cap" just above the base of the upper lobe, the surface pilose with gland-tipped hairs, also puberulent. Corolla strongly bilabiate, fully 3 cm long, the short tube bent upward at calyx summit into a narrowly funnelform throat, the 2 lips less than 1/2 the corolla, the upper one arching forward, somewhat keeled, 3-lobed, the terminal largest and emarginate, the laterals shorter, spreading forward, rounded, the lower lip directed somewhat downward, broadly ovate, slightly emarginate, the edges entire or erose; corolla surface pilose externally, pale blue at the upper throat and lips, shading to near white toward the base, the lower lip internally bearing blue-purple splotches and guidelines. Stamens 4, of 2 lengths, the filaments arching upward under the upper corolla lip, the anther backs pilose. Style elongated beyond the stamens and exerted slightly at the level of its forking apex.

Distribution and Flowering Season

Mixed hardwood-pine forest at southern end of Blue Ridge, northwestern Georgia and southeastern middle Tennessee; flowering May, early June.

Special Identifying Features

This species, with its large, pale blue flowers is closest to S. pseudoserrata, another rare species of the southern Appalachians, but differs from it in that its lower leaf surfaces are pubescent throughout (in S. pseudoserrata the hairs are confined to the leaf veins).

Habitats and Management Implication

S. montana is in rocky ravine-slopes and stream bottoms that have gravelly fine sandy loams, usually quite well drained. The overstory is of hardwoods mixed with

some yellow pine, thus these plants receive considerable shade. It is not known how this species responds to heavy logging of the overstory but it is likely that clearcutting would promote the increase of competing undesirable shrubs (Lonicera, Rubus) and vines (Pueraria, Lonicera, Smilax) which would tend to crowd them out. The steepness of the terrain this species is in precludes mechanical site preparation.

#### References

- Collins, Leo. 1976. A revision of the annulate species of Scutellaria (Labiatae). Unpublished PhD. thesis, Vanderbilt University.
- Epling, Carl. 1942. The American species of Scutellaria. Univ. Calif. Publ. Bot. 20 (1): 1-146.
- Small, J. K. 1933. Manual of the southeastern flora. pp. 1149-1153.

SPECIES: #95 Scutellaria montana Chajm. Skullcap or Helmet-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy					X	X		
Damage	X	NA						
No Lasting Effect				X				?
Beneficial if Done Properly								

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Scutellaria montana Chapm.



Paper 96  
Text & map by:  
Robert Kral

LAMIACEAE

Scutellaria thieretii Shinnars. Thieret's skullcap,  
skullcap or helmet flowers

Technical Description

An annual herb from a taproot.

Stems.--Erect or erect with short-curving bases, single or few, rarely branching, rarely longer than 6 dm pale green, spreading white-hairy.

Leaves.--In several pairs, opposite, short-stalked, spreading, the blades mostly ovate, rarely longer than 2 cm round-tipped, the margins unevenly low-crenate or low serrate, the bases attenuate, the surfaces pale green, softly short-hairy.

Inflorescence.--Flowers solitary in axils or mid and upper leaf pairs, spreading, on short, spreading-hairy stalks.

Flowers.--Calyx about 4 mm long (elongating in fruit) glandular short-hairy and ciliate mostly maroon. Corolla strongly 2-lipped, 7-14 mm long, the tube (fused part) near white, the lips bluish, the lower lip with a whitish center.

Fruit.--Nutlets nearly round, about 1.0-1.5 mm long, pebbled, dark brown.

Distribution and Flowering Season

This species is found only in the lower parishes of Louisiana, on shell sand or shell ridges, or in sandy meadow like clearings, these usually not far from brakish marsh. It blooms from April to June.

Special Identifying Features

It is closest taxonomically to S. drummondii Benth., a species whose lower leaves are smaller and longer-stalked, and whose upper (bracteal) leaves are conspicuously shorter than the flowers. In S. thieretii the leaves are hardly if at all reduced in size upward on the stem and the flowers are thus shorter than the leaves.

Habitats and Management Implication

S. thieretii has some weedy tendencies, appears to frequent small clearings, on moist but well drained sands, where the forest is dominated by Locust (Gleditsia) and Southern Hackberry (Celtis laevigata). Cutting of species would probably not effect it much, so long as the soils were not radically disturbed. Nothing is known about the response of this plant to grazing.

References

Shinnars, L. H. 1963. Sida I, No. 3: 251-252.

SPECIES: #96 *Scutellaria thieretii* Shinnery, Skullcap or Helmet-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect								?
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



LAMIACEAE

Stachys lythroides Small. hedge-nettles

Technical Description

A rather slender but tall (to nearly 1 meter) perennial herb, spreading vegetatively by elongate, whip-like slender stolons.

Stems.--Erect often with numerous, opposite, slender ascending branches, strongly 4-angled, the angles sharp or rounded, the interfaces concave, each a strong groove, the stem surfaces pale green or with touches of red below, smoothish or with scattered, stiff, spreading or reflexed pale hairs and spreading-bristly at the nodes.

Leaves.--Opposite, oblong, elliptic-oblong, or lanceolate the longest 6 cm. long, slightly broader than 1 cm.; blades subsessile or on stalks no longer than 3 mm., spreading, in numerous pairs on the stem and branches, acute, low-toothed, the bases narrowly rounded or acute, the surfaces smooth.

Inflorescence: Flowers nearly sessile, spreading appearing whorled in the axils of the upper leaf-pairs, in bloom slightly longer than 1 cm.

Flowers.--Calyx narrowly bell-shaped, about 5 mm. long the sepal bases fused, the lobes 5, triangular-acuminate, erect, about as long as the tube, the surfaces with a few spreading stiff hairs. Corolla strongly 2-lipped, about 1 cm. long, pink, the lips somewhat shorter than the tube (fused part), the upper one projecting forward, oblong, the lower directed downward, 3-lobed; outer surface of upper lip with short, bristly hairs, that of lower lip sparsely so, that of the corolla tube scattered-short-hairy. Stamens 4, the dark anthers with spreading locules, projected beyond the corolla tip on slender, flattish, hairy filaments.

Fruit.--Nutlets about 2 mm. long, broadly obovoid.

Distribution and Flowering Season

This hedge-nettle is confined to low sandy or sandy-peaty areas of bottomland hardwoods, usually near streams and in shade or full sun. So far it is known only from northern Florida. It blooms in mid and late summer.

Special Identifying Features

It is closest in appearance to S. hyssopifolia, but that species has very narrow sharp, stiff sepal tips and entire leaves. It also bears a resemblance to S. ambigua, but that species is more pubescent and has more strongly serrate, hairy leaves. The genus is currently under revision, so that all these might ultimately be considered subspecies.

Habitats and Management Implication

S. lythroides appears to react, within its narrow range, almost as a weed to such disturbance as clear-cutting. An R. K. Godfrey collection (73824) from Leon County north of Tallahassee (the county which the species was first found) is

from a clear-cut area of bottomland hardwoods from which all slash and stumps were removed. Here the plants were abundant, quite possibly responding through removal of shade and woody plant competition. Under normal conditions such a species probably maintains itself in small natural clearings in such forest. However, drainage of bottoms would probably eliminate the species from the habitat.

#### References

Small, J. K. 1933. Manual of the Southeastern Flora: pp. 1159-1161. Chapel Hill, North Carolina.

Stachys lythroides Small





LAMIACEAE

Synandra hispidula (Michx.) Baill. N.C.N.

S. grandiflora Nutt.

Technical Description

Annual or biennial herb bolting from overwintering rosettes.

Stems.--Solitary or several, to 5 dm. long, erect or ascending, rather stout but soft, quadrate, pale green with a scattering of spreading soft hairs.

Leaves.--Rosette leaves present at flowering, on long, spreading-hairy stalks the blades broadly ovate, acute or acuminate, the margins crenate, the bases cordate, the surfaces appressed-hairy. Stem leaves opposite, crowded toward the base, distant toward mid-stem, also long-stalked and with blades similar to rosette leaves, those in the inflorescence becoming sessile and smaller.

Inflorescence. Flowers in narrow, leafy-bracted racemes, solitary, erect and opposite in the bract axils, sessile, showy.

Flowers.--Calyx bell-shaped, about 1 cm. long, the lobes triangular, ciliate subulate (with sharp narrow stiff points) longer than the tube (fused part), the surfaces villous (long-soft-hairy). Corolla strongly bilabiate, about 4 cm. long, the tube and throat yellowish-white, narrowly funnelform, the upper lip arching forward, broad, the lower of 2 spreading narrower lobes and a central broader downward-pointing retuse lobe, this marked with purple guide-lines, the outer surface finely hairy. Filaments 4, of 2 lengths, hairy, projecting beyond corolla throat; fertile anthers 2, short-spurred.

Fruit.--Nutlets obovoid, smooth, ca. 3 mm. long.

Distribution and Flowering Season

This species is found in rich, mixed-mesophytic forested ravines, usually in moist to even wet loams or clay loams and primarily over limestone parent material, often on and around rocky detritus. It occurs from southern Illinois and Ohio southward through Kentucky and Tennessee into northeastern Alabama and flowers in May and June.

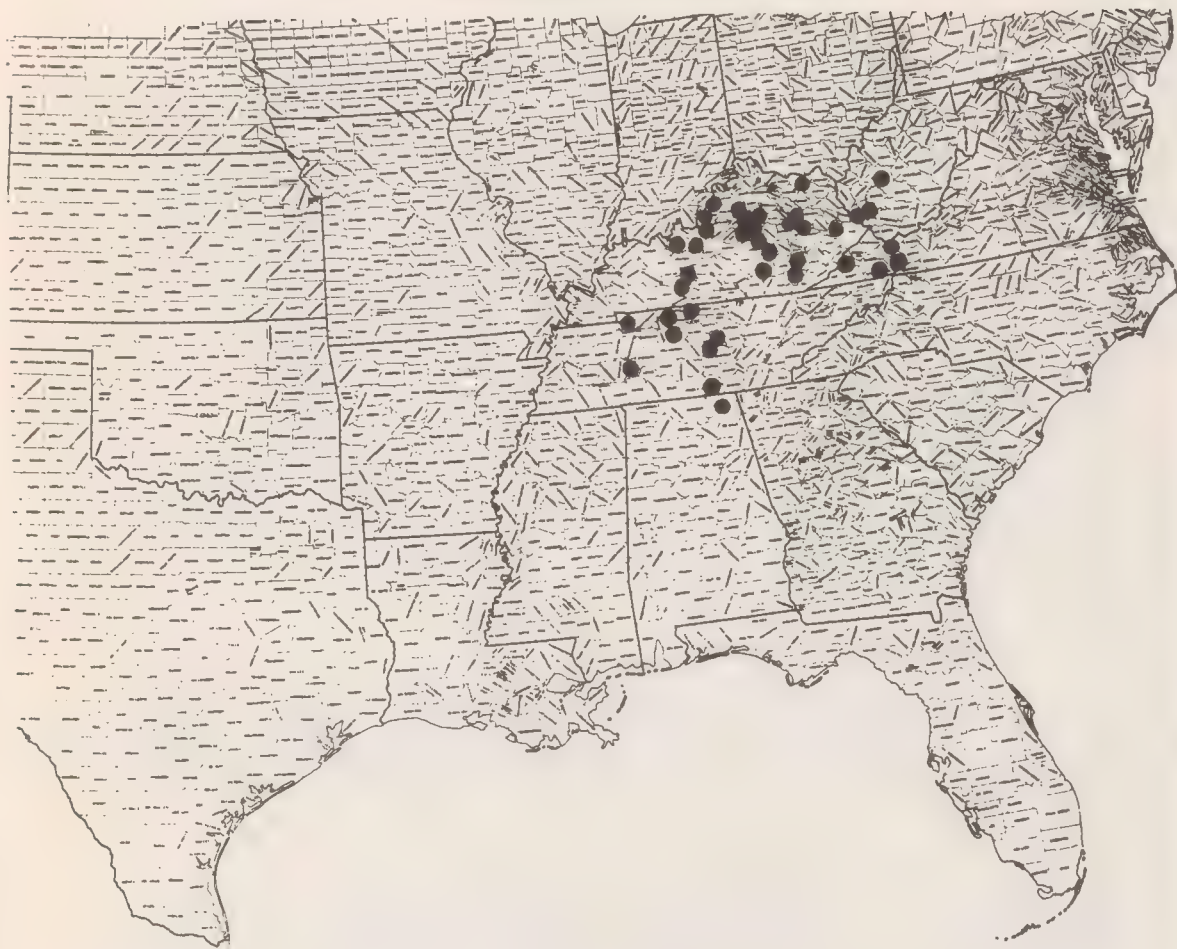
Habitats and Management Implication

S. hispidula is definitely a shade plant, requiring soil that is highly loamy and permanently moist. Careful selective logging, which would limit danger from subsequent erosion or serious opening of the canopy, would probably not effect it adversely. Clear cutting in the steep situations it frequents would, through erosion, subsequent drying, and excess insolation eliminate the species. Grazing would similarly reduce or eliminate it, probably through disturbance of the plants and the soil by trampling; comparison of grazed versus ungrazed woodlands where this plant occurs shows no plants where cattle are allowed.

References

1. J. K. Small. 1933. Manual of the Southeastern Flora, pp. 1156-1157. Chapel Hill, North Carolina.

Synandra hispidula (Michx.) Baill.



Paper 201  
Text & Map by:  
Robert Kral

SOLANACEAE

Solanum carolinense L. var. floridanum Chapm. Florida horse-nettle  
S. floridanum Shuttlw. ex Dun. in DC. non S. floridanum Raf.  
S. godfreyi Shinnery

Technical Description

Woody-based, monoecious perennial herb from a deep-set tuberous rootstock.

Stems.-- Erect or spreading, simple to copiously branching, 2-6 (-10) dm tall, terete, yellow-green save for thin, cracking brownish bark at stem base, the surface smooth toward stem base, upwardly with scattered stellate hairs, (these most abundant toward shoot tips) also sparingly to copiously armed with stiff, stout-based, spreading yellow spines to 1 cm long.

Leaves.-- Alternate, simple, petiolate, the lowermost usually absent by flowering time, those toward middle of main axis largest, the blades deeply pinnately lobed, mostly 8-15 cm long, the lobes ranging from oblong to triangular, their tips rounded to acute, symmetrical or oblique, the sinuses broad; upper leaf surface deep yellow-green, with scattered stellate pubescence; lower surface paler, more copiously stellate-hairy, also spine-armed at least along the prominent mid-vein, sometimes along the major branch veins.

Inflorescence.-- Racemes developing between all or most upper leaf nodes, spreading-ascending, mostly 6-12-flowered, coiled toward their tips, much elongating during the long flowering season, the female flowers lowermost, the axis spinose and stellate-hairy.

Flowers.-- Regular, unisexual on spreading (in female becoming reflexed) slender, stellate-hairy pedicels reaching ca. 1 cm by anthesis; sepals 5, united, the calyx campanulate, green, stellate-hairy, the tube 2.0-2.5 mm long, the 5 ascending or spreading lobes subequal, narrowly triangular-subulate; petals 5, united, the corolla rotate, 3-4 cm wide, the spreading lobes 1.0-1.5 cm long, triangular, the surface from white to lavender, the lobes stellate-purulent medially on the backs, otherwise smooth; stamens 5, epipetalous toward corolla base, the staminal filaments ca. 1 mm long, the basifixed, linear-oblong, erect anthers yellow, ca. 1 cm long, opening by terminal pores; ovary superior, broadly ovoid, smooth or with scattered simple hairs, the style short-linear.

Fruit.-- Berries born on stiffly recurved stalks to 2 cm long, these gradually dilated toward apex, the calyx not enlarged but persistent around fruit base; body of fruit globose, 1.0-1.5 cm thick, gummy-meated, ripening yellow or orange-yellow; seeds numerous, flattened, nearly round, 2.5 mm broad.

Distribution and Flowering Time

Sandy clearings and open woodlands, northern Florida and adjacent south Georgia; flowering intermittently from late spring through the growing season.

Special Identifying Features

S. carolinense var. floridanum is distinguished from S. carolinense proper by its deeper pinnatifid leaves, but because of the frequency of intermediate leaf forms between the varieties, should perhaps be considered merely a form.



### Habitat and Management Implications

This Solanum is found on sandy soils, usually in clearings in disturbed, open hammocks, in fields or along roads. Sometimes it is found in swamp woodlands, but there only on sandy rises, usually where there has been some soil disturbance. This is usually where there has been some soil disturbance. This is plainly a weed, sometimes invades gardens or cultivated fields. Its tendency to grow along railroads, or highways, or in gardens, old fields and empty lots in towns would appear an indication that it would persist, even increase in numbers, with disturbance.

### References

- D'Arcy, W.G. 1974. Solanum and its close relatives in Florida. Ann. Mo. Bot. Gard. 61: 819-867.
- Chapman, A.W. 1860. Flora of the southern United States, p. 349. Cambridge, MASS.
- Shinners, L.H. 1962. Solanum godfreyi Shinners, nom. nov. Sida 1: 108.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1112-1116. Chapel Hill, N.C.

SPECIES Solanum carolinense L. var. floridanum Chapm.  
Florida horse-nettle

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect		X	X	X				X
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Solanum carolinense L. var. floridanum Chapm.





SCROPHULARIACEAE

Agalinis pseudaphylla(Pennell) Pennell

Gerardia pseudaphylla Pennell

Agalinis oligophylla var. pseudaphylla (Pennell)Pennell

Status: Threatened

Technical Description:

Annual, root-parasitic, 4-7 dm tall, the shallow roots sparse, slender, fibrous.

Stems: erect or ascending, usually single from the rootstock, branching abundantly at or above middle to form a broad crown of arching, ascending to spreading, elongate, slender but brittle branches, the main axis subterete, decurrently low-wire-ridged below the scattered nodes, dull green, papillose, the slender, usually opposite, branches arching upward or outward, often purple-tinged, prominently ribbed and grooved, the ribs scabrid.

Leaves: acicular, small, the largest usually 5 mm or less long, spreading-ascending, fleshy, alternate, less often subopposite, mostly distant along stem (the lowest absent by anthesis), in inflorescence branches becoming very short and in cross section angulate, the surfaces dull green, scabrid.

Inflorescence: a compound of racemes, these developing flowers and/or branchlets mostly in the distal 1/2, the flowers several-to-many either on simple short pedicels or short, few-flowered branchlets, each pedicel or branchlet subtended by a single ascending or erect bractlet 3 mm long or shorter.

Flowers: bisexual, the calyx regular, the corolla slightly irregular, the pedicels slender, stiffly spreading-ascending, mostly 3-5 mm long (be sure to check "longer" pedicels as these may, by jointing, show that they are actually short branches!), often reddish-tinged, smooth, teretish or slightly angulate; calyx broadly campanulate, at anthesis ca. 2.5 mm high, thin, faintly veiney, the rim entire, subscarious, bearing externally just below its edge 5, equidistant, callus-like, bristly scabrid, narrow and low-conical teeth, these 0.2 mm long or less; corolla showy, from base to tip of lower lobes ca. 2 cm long, the short tube flaring abruptly to the funnelform throat, the throat rim oblique (throat longer on the lower side), the limb ca. 2 cm across, the 5 lobes suborbicular or broader than long, broadly rounded or apically somewhat truncated, erose, ciliate, equally spreading but on an oblique plane, the external surface pale pink, smooth, grading downward to more yellow-tinged and minutely puberulent, internally with lobes pink, smooth, the throat from base of lobes downward becoming villous with long, slender purplish hairs and more yellowish, usually with 2 strong yellowish bands anteriorly (on lower side as flower is oriented); stamens 4, epipetalous, didynamous (2 pairs set at 2 different levels), the slender filaments filiform, slightly to shaggy-villous, purplish, the anthers suberect but dorsifixed, pale yellow, ca. 2 mm long, elliptic-oblong, shaggy-white villous on the backs, each locule horned at the base; ovary superior, narrowly ovoid, shorter than the calyx rim, bicarpellate, the slender style ca. 1 cm long, the 2 linear, erect stigmas ca. 1-3 mm long.

Fruit: Capsule at maturity subglobose, ca. 4.5 mm long, 1/2 or

less its length included by the persistent calyx, smooth, pale brown; seeds numerous, ca. 1 mm long, somewhat compressed, wedge-shaped, strongly reticulate with sharp, thin, raised ridges, a pale lustrous brown.

#### Distribution and Flowering Season:

Moist acidic pine flatwoods or savannas, hardwood flats, Coastal Plain and Interior Low Plateau, southern Mississippi, middle Alabama, the Highland Rim of middle Tennessee; flowering from September into October.

#### Special Identifying Features:

This is a difficult genus, as yet unsolved for the southeastern U.S. However, the only species in our area that combine a fairly tall stature with reduced, linear-acicular leaves and very small (callose) calyx lobes are A. microphylla, A. aphylla and A. pseudaphylla. The first has longer calyx lobes and 1/2 or more of its ripe capsule is enclosed by calyx tube. A. pseudaphylla and A. aphylla differ (perhaps only varietally!) in that the former has narrower and at the same time longer, more spreading leaves (3-6 mm versus 1-3 mm, narrowly linear-triangular versus scale-like) and longer pedicels (3-6 mm versus 1-3 mm).

#### Habitat and Management Implications:

Given that the same entity is involved throughout the stated range, the habitat of A. pseudaphylla includes a wide variety of site conditions. The problem is that one set of specimens has been gotten from Sumter County, Alabama, in what is known as blackbelt prairie, which in that area is a heavy clay overlying chalk and is probably at least circumneutral. On the other hand the type locality, near Biloxi, Mississippi, is, or was, presumably flatwoods-savanna, moist, sandy-peaty, and quite acidic. This last is the sort of situation found for plants in Tennessee referable to the species, even though Pennell (1935) did not indicate that the range of A. pseudaphylla includes Tennessee. The southern Mississippi populations are found in Longleaf Pine-Gallberry-Titi-Vaccinium formations where fire and other disturbance has created grass-sedge openings. The Tennessee localities are homogeneously "oak-barren", again savannalike, relatively level, underlain by hardpan and frequently quite moist. These places also have a history of fire, this increasing the spacing of trees, and allowing a grass-sedge assemblage to develop, this savanna having a lower Coastal Plain character but with no pines. Instead the overstory is largely oak-hickory, with the major species being Quercus phellos, Q. nigra, Q. falcata, Q. stellata, Q. alba, Carya tomentosa, C. glabra, Acer rubrum, Liquidambar, Liriodendron. The shrub cover is a mixture of Vaccinium (high and low bush), Rhododendron canescens, Dwarf Willow, Viburnum, Rhus, Spiraea tomentosa, Crataegus, Aronia, etc. The more open sites in which the Agalinis is local are, during its anthesis, Andropogon virginicus-A. ellipticus-A. scoparius-A. glomeratus-A. gerardi-Sorghastrum nutans-Panicum virgatum-P. anceps-Chasmanthium laxum & sessiliflorum-Gymnopogon-Paspalum laeve-P. floridanum-Aristida-Carex glaucescens and other carices-Rhynchospora capitellata-R. corniculata-Fimbristylis puberula-Xyris torta-several orchids, particularly Spiranthes, Habenaria, Linum, many Polygala,

Hypericum stans, H. hypericoides, H. densiflorum, Rhexia, Asclepias hirtella, several Ludwigia, particularly L. hirtella, and a large number of composites including Silphium mohrii, S. terebinthinaceum, Helianthus angustifolius, Parthenium integrifolium, Vernonia, several Eupatorium, Liatris spicata, L. earlei, Bidens, Coreopsis tripteris, many Aster. Other Agalinis may be abundant, these mainly A. tenuifolia, A. obtusifolia, A. decemloba, A. purpurea, A. virgata. The greatest threat to middle Tennessee populations comes from clearing and draining of the oak barrens either for real estate or for improved pasture or row crop agriculture.

Habitat in the Gulf South is, in addition to having the problems mentioned above, much of it converted by way of drainage and mechanical site preparation for Slash Pine. Any mechanical site preparation involves radical disturbance of the grass-sedge system that this Agalinis is an integral part of. Protection of these areas from fire ultimately causes another problem, with shrubs and trees increasingly taking over.

#### References:

- Pennell, F.W. 1935. The Scrophulariaceae of eastern temperate North America. Acad. Nat. Sci. Phila. Monogr. 1: 453-456.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1216-1221.



SPECIES: Agalinis pseudophylla (Pennell) Pennell

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Drainage is a major problem!

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Agalinis pseudaphylla (Pennell) Pennell



SCHROPHULARIACEAE

Amphianthus pusillus Torrey. little amphianthus

Technical Description

Delicate or diminutive, shallow-and-fibrous-rooted annual.

Stems.-- Main axis erect, short (mostly 2-5 mm high), greenish or purplish, the single internode ca. 1 mm wide, longitudinally 4-ridged, at its summit bearing a pair of oppositely spreading, linear-triangular leaves (bracts?) which subtend a central floret which terminates the main axis; primary branches (peduncles?) 2 or more, arising around the central floret, the bases telescoped, ranging from but a few millimeters long to fully 2 decimeters long, depending on water depth, all actually inflorescence branches in an open cyme, all terminating in a pair of spreading, broadish bracts which subtend solitary flowers and which float like pads in the vernal pools.

Leaves.-- Opposite, decussate. Lowermost leaves (those subtending the first flower), linear-triangular, ascending or spreading to 5 mm long, those of the branch bases usually in 2, overlapping pairs and slightly shorter, those terminating the variously elongated terminal internode (inflorescence branch?) spreading, obovate, broadly ovate, or elliptic, mostly 3-5 mm long, rounded to slightly retuse, entire, the bases broadly or narrowly acute, sessile or nearly so, green, often with maroon edges, inconspicuously veined, minutely glandular-punctate.

Flowers.-- Zygomorphic, bisexual, solitary in axils of bracteal leaves, at anthesis erect on short pedicels mostly 0.1-0.2 mm long, these after anthesis recurving and elongating; calyx campanulate, ca. 1.5 mm long, the tube short, the limb oblique, spreading in fruit, the lobes 5, slightly unequal, oblong, ovate or suborbicular, ascending at anthesis, the lowest smallest, narrowest, all blunt or rounded-tipped, greenish or maroon-tinted; corolla white, at anthesis ca. 3-4 mm long, the tube and throat ca. 2 mm long, the 5 lobes nearly erect or slightly spreading, nearly equal, short-oblong, rounded or emarginate, the lower one slightly larger, emarginate; stamens 2, epipetalous 1/2 way up the corolla tube, the filaments capillary, short, ca. 0.3 mm long, the anthers yellowish, nearly round, the sacs slightly divergent, 0.5 mm long; staminodia absent; ovary superior, bilobed, ca. 1 mm high, the style erect, ca. 1 mm long, the stigmatic apex bilobed, the lobes flat.

Fruit.-- An obcordate, tumidly bilobed, 2-locular capsule ca. 3 mm high, carinate along the valve margins, the stalk of the mature fruit usually strongly recurved; seeds numerous, short-cylindrical and curvate (banana-shaped) ca. 1 mm long, dark brown, with numerous prominent longitudinal ridges and slightly less distinct cross lines.

Distribution and Flowering Time

Vernal pools in granite outcrop areas of Piedmont Alabama, Georgia and South Carolina; flowering from late March into April.



### Special Identifying Features

A. pusillus, a monotypic genus, is perhaps in floral character most similar to the genus Gratiola. Certainly in Gratiola there are species which show reduction to 2 viable stamens and no staminodes, and which have bilobed, laminal stigmas and similar (though larger) corollas. Seed character in the two general is similar. However, Amphianthus differs from all other southeastern area Scrophulariaceae as follows:

1. The leaves are strongly dimorphic. The lower pairs are subulate, yet from the shoots above the first node of branches a variously elongated (depending on depth of pools) internode develops which terminates in a pair of opposite, much broader leaves that float, padlike, as in Callitriche heterophylla. These elongated internodes have been referred to as pedicels, the floating, opposite leaves as bracts. However Small (1933) and Pennell (1935) refer to them as branches and leaves. In any event, this small plant, above the level of its comparatively stocky first internode, could be said to be mostly inflorescence.

2. The corollas are very small, smaller than in any other southeastern member of the Scrophulariaceae, and are similar to Gratiola or Bacopa, this in contrast to the tumid, obcordate capsules which are similar to those of Veronica.

### Habitat and Management Implications

Amphianthus grows in full sun in and around edges of vernal pools on granite, its roots in the shallow, s dy-silty wash that accumulates there. In dry seasons it often does not appear, the seeds appearing to lie dormant until favorable winter moisture conditions develop. Length of elongate, round-bracted pedicels varies depending on water depth. Associated species in and around the pools are usually Isoetes spp., Diamorpha cymosa, Arenaria uniflora, A. glabra, Lindernia monticola, Juncus georgianus, Agrostis, Panicum, etc. Where there is sufficient soil depth over the granite an oak-yellow pine forest community usually forms, this generally with an understory of Rhus, Vaccinium, Chionanthus, Calamintha, Hypericum, etc. The vine Gelsemium sempervirens is common, as are Smilax, Anisochistus, Campsis, Vitis. Only the deeper, more permanent pools support Amphianthus and such pools are rare even in the best localities. Shade eliminates this plant. The main threat to known populations appears to be a combination of destruction of the granite outcrops by quarrying and damage done to the small pools by hickers and motorcyclists.

### References

- McVaugh, R. and J.H. Pyron. 1937. The distribution of Amphianthus in Georgia. Castanea 2: 104-105.
- McVaugh, R. 1943. The vegetation of the granite flat rocks. Ecol. Monogr. 13: 120-166.
- Pennell, F.W. 1935. The Scrophulariaceae of eastern temperate North America. Acad. Nat. Sci. Philadelphia, Monogr. 1: 110-112.

Torrey, J. 1837. An account of several new genera and species of North American plants. Ann. Lyc. Nat. Hist. N.Y. 80-94.

Small, J.K. 1933. Manual of the southeastern flora, pp. 1193-1194. Chapel Hill, N.C.

SPECIES Amphianthus pusillus Torr. Little amphianthus

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA			NA	
Damage No Lasting Effect								X
Beneficial if Done Properly					X	X		

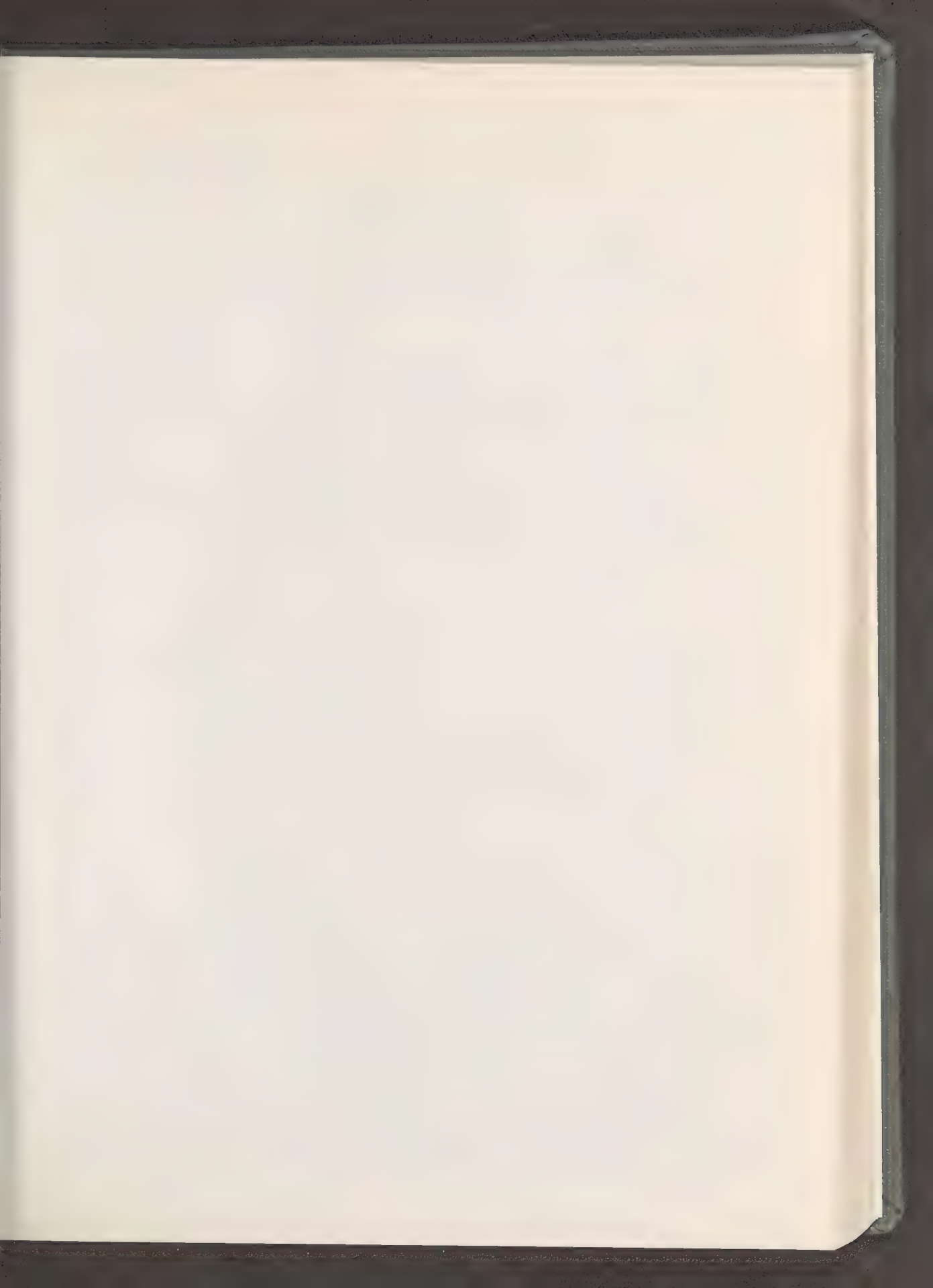
Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Amphianthus pusillus Torrey





SCROPHULARIACEAE

Aureolaria patula (Chapm.) Pennell

Dasystoma patula Chapm.

Gerardia patula (Chapm.) Gray

Status: Threatened

Technical Description:

Rather coarse perennial, root-parasitic, False-foxtail, from stout-branched, though shallow, roots.

Stems: erect to decumbent, usually several from rootstock in older plants and spreading out, leaning or prostrate as season advances, to 12 dm long, terete, with low ridges below petioles proximally, and dull green, distally sub-quadrate and tinged with red or maroon, sparsely puberulent, the branching sparse or absent below the inflorescence, within the inflorescence opposite and sometimes from every node.

Leaves: opposite, estipulate, the largest produced in tufts of rosettes in spring, these and lower stem leaves usually absent by anthesis, the largest persistent leaves lowest, to 2 dm long, the blades ovate or lance-ovate, strongly incised-pinnatifid, the deepest lobes lowest, themselves pinnately lobed or at least coarsely triangular-toothed, the base hastate or truncate or abruptly attenuated, forming a wing on most of the petiole, the surface above dull yellow-green, smooth except for a puberulence along the impressed midrib, the lower surface raised-reticulate, paler yellow-green, sparsely puberulent, particularly on the veins, the blades progressively shortening and shorter-petiolate upward on stem and branches, becoming mostly lanceolate, entire, serrate or serrulate, sessile in the inflorescence.

Inflorescence: a compound, oppositely branched system of racemes, the slender but stiffish pedicels mostly 1.2-2.5 cm long, densely to sparsely puberulent, usually reddish-tinted, arching upward, thus the flowers erect or spreading on the branch.

Flowers: bisexual, somewhat zygomorphic, showy, the sepals 5, united below into a campanulate tube 3-5 mm long, the lobes narrowly linear-triangular, subequal, slightly venose, 4-7 mm long, the whole surface externally puberulent, green, the inner face of the lobes puberulent; corolla butter-yellow, 3.0-3.5 cm long, the short tube expanding in funnel-form fashion, the lobes 5, somewhat spreading, suborbicular, the upper 2 slightly larger, ca. 1 cm long, the lower 3 slightly more spreading, all somewhat ciliate, the surface externally smooth, internally villous, particularly toward the base; fertile stamens 4, didynamous, attached near corolla base, the longer pair ca. 2 cm long, the shorter pair ca. 1.5 cm long, the slender filaments villous, arching up under the upper throat, the anthers ellipsoidal, dorsifixed, ca. 4 mm long, externally villous-hirsute, each locule bearing proximally a sharp narrow horn ca. 1 mm long; ovary superior, bicarpellate, ellipsoidal, smooth, the numerous ovules with axile placentation, the slender style arching up under the upper (dorsal) side of the corolla and terminating in an erect pair of short-linear, laminar stigmas presented slightly beyond the level of the longer stamens.



Fruit: Capsule ovoid, 5-6 mm long, smooth; seeds curvate-angulate, to 2.5 mm long, brown, reticulate.

**Distribution and Flowering Season:**

Calcareous river and creek bluffs and cliffs, middle Kentucky southward into middle Tennessee and northwestern Georgia; flowering from August to frost.

**Special Identifying Features:**

This False-foxglove is in subgenus Aureolaria (Buaureolaria Pennell), distinguishable from subgenus Panctenis by having at least narrowly winged seed, an e-glandular capsule, an externally smooth corolla and a perennial habit. It is distinguished from the seven other species of subgenus Aureolaria by a combination of puberulent stem and pedicels, puberulent, entire calyx lobes. This combination would place it nearest A. dispersa, a Coastal Plain species, from which A. patula is distinguished by its longer (15-25 mm versus 8-10 mm) pedicels, its longer, narrower calyx lobes, its smaller (35-45 mm long versus 40-50 mm long) corollas. The flowering branches are usually strongly spreading (erect on prostrate stems), slender but stiffish, the numerous nodes with spreading, subequal lanceolate bract pairs, at anthesis sometimes quite showy with double rows of fine yellow blooms.

**Habitat and Management Implications:**

A. patula appears to be genuinely narrow in range and rather rare within that range, with certain and recent sightings being made from along the bluffs of the Tennessee and Clinch Rivers and tributaries in the Valley and Ridge Province of eastern Tennessee and along the Coosa River in northwestern Georgia near Rome (the type locality). Dr. Leo Collins has recently located several small populations in the area of Kingston, Tennessee, along river bluffs, and may be the only living botanist to have seen much of the species. My own experience with it is from but two areas, one near Kingston, the other from bluffs of the Coosa River near Rome.

This species appears to be a calciphile, is reportedly root-parasitic on oaks. It is generally found on steep limestone bluffs, in the shade of rather open stands of mixed hardwoods and occasional Juniperus. The soil is heavy, often shallow. Commonest overstory trees are Quercus muhlenbergii, Q. alba, Q. shumardii, Acer saccharum, Fraxinus quadrangulata, F. americana, Ulmus americana, U. rubra, Carya caroliniae-septentrionalis, C. ovalis, with an abundance of Cercis, Rhamnus, Forestiera ligustrina, Viburnum rufidulum, Philadelphus, Rhus spp. in the understory. Common herbaceous associates are Chasmanthium latifolium, Melica, Bromus purgans, Elymus, various calciphilic carices, Anemone virginica, Aquilegia, Galium circaezans, Spigelia marilandica, Asclepias quadrifolia, Saxifraga, Heuchera villosa, Penstemon, Solidago sphacelata, S. ulmifolia, Aster shortii, etc.

The steepness of the terrain frequented by this species precludes heavy logging. The timber is not easily accessible and any heavy removal of it would have an adverse effect in terms of erosion of the soil mantle. Recent observations of the plants appear to have it in light to fairly heavy shade thus it is likely that

removal of overstory would, in addition to exposing this herb to too much light and drying, invite invasion of undesirable woody and herbaceous weeds such as Smilax, Lonicera, Pueraria, Rubus.

References:

Chapman, A.W. 1878. Dasystema patula in Bot. Gaz. 3: 10.

Pennell, F.W. 1928. Aureolaria patula in Proc. Acad. Nat. Sci. Phila. 80: 409-410.

\_\_\_\_\_. 1935. Aureolaria in Scrophulariaceae of eastern temperate North America. Acad. Nat. Sci. Phila. Monogr. 1: 397.

Small, J.K. 1933. Manual of the southeastern flora, pp. 1213-1216.

SPECIES: Aureolaria patula (Chapm.) Pennell

Expected* Effect on Habitat	Prescribe Burn	Dose or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy	NA	NA	NA	NA		x	NA	
Damage					x			
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.



Aureolaria patula (Chapm.) Pennell



## SCROPHULARIACEAE

Penstemon dissectus Ell. Dissected beardtongue

## Technical Description

Tufted perennial beardtongue from a fascicle of fleshy roots.

Stems.--Of two sorts, the floriferous ones numerous, radiating from a short crown, mostly 3-6 dm long, decumbent-based, then erect, stiffish, terete, minutely puberulent, proximally and distally purplish, at mid-stem greenish, slightly glaucous, usually unbranched below the inflorescence; sterile offshoots produced also, these usually strongly decumbent or procumbent, with trimorphic leaves.

Leaves.--Opposite, estipulate, those lowest on flowering stems short, scalelike, their margins coarsely pectinately fringed, grading evenly upward to full-sized cauline leaves, these in outline broadly oblong, ovate or even triangular, mostly 3-6 cm long, sessile with a clasping base, spreading or ascending, approximate, deeply dissected into several lineal or linear-spatulate, spreading segments, these sometimes distally deeply lobed or pinnately lobed, the segment tips with a blunt, reddish callus, the primary segment bases merging with a broadly winged midrib; segment margins very revolute; leaf surface above deep yellow-green, puncticulate, below paler, punctate, only the midribs evident, these retrorsely scabro-puberulent; leaves gradually diminishing in size, becoming more distant upward on stem, the longest internode comprising the peduncle. Leaves of sterile shoots trimorphic, the lowest scalelike, those of midshoots as in flowering stems, those distal (and overwintering) evergreen, linear, oblong or spatulate, usually sinuate or low-toothed, rarely if at all narrowly lobed, mostly 3-6 cm long.

Inflorescence.--A terminal, stiffly erect, panicle on a leafless purplish, small-bracteate peduncle of varied length, but up to 1 dm long, the branching opposite and ascending, the lower branches longest, all branches naked at the base, toward tips producing asymmetrical, few-flowered cymes; pedicels slender, stiffish, terete, retrorsely puberulous, purplish, 5-15 mm long.

Flowers.--Perfect, zygomorphic, usually spreading horizontally or suberect; sepals 5, green rimmed with red, slightly unequal, the calyx broadly campanulate, ca. 5 mm long, the lobes ovate-triangular, the lowest longest, all acute, the margins glandular-ciliate, entire or denticulate apically, the surface externally stipitate-glandular; corolla gamopetalous, zygomorphic, 2.5-3.0 cm long, the short tube ca. 5 mm long, 3-4 mm broad, widening into a campanulate, oblique-orificed throat ca. 1.5 cm long, 1.0-1.2 cm wide at orifice, the 5 subequal, nearly round lobes all nearly equally spreading, the lowest slightly longer, projecting more, the corolla lively lavender-rose with deeper lines, externally stipitate-glandular, internally smooth save for a white-bristly pilosity at base of lower 3 lobes; stamens 5, the longest one a linear-clavate stamin-

ode that is bristly-white-hirsute distally, all arising at the corolla tube, the fertile filaments arching downward, slender, terete, basifixed to ellipsoidal, divergent purplish anther sacs, these muriculate, sometimes with a few bristly hairs along the dehiscence line; ovary superior, 2-locular, lance-ovoid, smooth, about as long as the calyx, tapering into a linear, up-curved style, this terminating in a short stigma.

Fruit.--Capsule lance-ovoid, tapering to an acuminate beak, ca. 1 cm long, smooth, brown, the valves somewhat woody; seeds numerous, asymmetrically broadly wedge-shaped and prismatic, ca. 2.0-2.5 mm long, dark brown, minutely alveolate (honeycombed).

#### Distribution and Flowering Season

Gritty sands and gravels of outcrops and environs of same, Coastal Plain Georgia; flowering from late April to early June.

#### Special Identifying Features

This is the only Penstemon in the southeastern area that has deeply dissected leaves.

#### Habitat and Management Implications

P. dissectus appears to be confined to outcrops of siliceous rock or of sandy gravelly soils nearby. It may be abundant very locally on outcrops of the Altamaha Grit, a ferruginous gravelly sand that is known to have on it several other rare endemics (including Elliottia, Marshallia ramosa, Physostegia veroniciiformis, Rhynchospora punctata, Hypericum lloydii, Arenaria uniflora, Talinum teretifolium, etc.) The aspect is savanna, the overstory on the outcrops and thin sandy soil around them being a scattering of longleaf pine, bluejack oak, sandhills post oak, turkey oak, black oak, blackjack oak, persimmon, sassafras, dogwood, black cherry, etc. Among the shrubs present are many ericads such as Vaccinium arboreum, V. floridanum, V. myrsinites, V. stamineum, Gaylussacia dumosa, G. frondosa, and an abundance of Rubus cuneifolius, Smilax (several kinds). The sites are dry much of the year but have some seep areas or depressions in the rock where there is moist to wet inwash and thus some very localized bogs develop. The wiregrass Aristida stricta is common in the Penstemon sites, which are dry, and most of the associate species of herbs are those that appear on dryish sands. The system is fire-disclimax and much of the Penstemon area shows a current to comparatively recent evidence of burning which tends to maintain the savanna. Protection from fire would of course increase the percentage of woody and herbaceous competition, which would both crowd and shade out the Penstemon, a plant of full sun or light shade. Some Penstemon areas I have visited have been planted to rows of slash pine, the result being that this



beardtongue disappears as the pine crowns close.

#### References

Small, J. K. 1933. Manual of the southeastern flora, pp.  
1201-1205. Chapel Hill, N. C.

SPECIES Penstemon dissectus Ell. dissected beardtounge

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: in some localities this plant is on rock, thus  
mechanical site preparations cannot be applied

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Penstemon dissectus Ell.





SCROPHULARIACEAE

Schwalbea americana L.

S. australis Pennell

Status: Endangered

Technical Description:

Perennial, caulescent, root-parasitic herb.

Stems: erect, simple or branched only at base, rarely taller than 6 dm, the nodes numerous, the internodes terete, villous proximally, puberulent distally, yellow-green tinged with red or purple distally.

Leaves: alternate, estipulate, sessile, the larger sometimes spreading, but mostly all ascending or erect, overlapping in a tight spiral, the smallest scale-like at stem base, the largest in the lower 1/3 of the stem, elliptic, lanceolate, rarely oblanceolate, mostly 2-4 cm long, rather fleshy, acute, entire, slightly revolute, the base cuneate, the surface yellow-green or deep dull green with red undertones, both sides pale-villous-puberulent, the venation sparsely pinnate, impressed above, only the midvein much raised beneath, or triplennerved; foliage leaves grading gradually smaller and narrower upward into bracteal leaves.

Inflorescence: Flowers ascending, short-pedicellate from axils of leaflike bracts, in a tight, usually many-flowered, spikelike raceme, the pedicels ca. 2.0-2.5 mm long, villosulous, apically bibracteolate, the bracteoles linear, shorter than the calyx.

Flowers: bisexual, strongly zygomorphic; calyx 1.5-2.0 cm long, the lobes 5, unequal, triangular, 1-nerved, shorter than the narrowly campanulate tube and projecting forward, the upper lip shallowly 2-lobed distally, the lower 3-lobed and longest, the tube strongly 10-nerved; corolla strongly bilabiate, narrow, ca. 3 cm long, proximally yellow, distally purplish or reddish, the lips about as long as the tube and projecting forward, the upper a galea, longer, shallowly 2-lobed distally the lower 3-lobed and with a hairy palate inside; stamens 4, epipetalous, included in the upper lip, didynamous (1 pair shorter), the filaments slender, smooth, longer than the oblong, dorsifixed yellow anthers; ovary superior, erect, bicarpellate, the slender style curved up and arching within the upper corolla lip in line with the filaments, its narrow stigma protruding slightly beyond.

Fruit: Capsule mostly contained in the persistent calyx, oblong-cylindrical, ca. 1 cm long, septicidal, its narrowed apex developing an annulus around the persistent style base; seeds numerous, pale greenish-brown, linear-fusiform, somewhat compressed and bordered, ca. 2.5-3.0 mm long, very minutely cancellate.

Distribution and Flowering Season:

Moist pine flatwoods, savannas, bog borders, open oak woods, Coastal Plain with extensions inland in New York and in Massachusetts and the southern Appalachians, southward to northern Florida and westward into Louisiana. Rare and extremely local. Flowering in the south mostly from April into June.

Prepared by:  
Robert Kral  
*Schwalbea americana*, p. 2

#### Special Identifying Features:

Chaffseed is monotypic and is, in habit and general appearance of bloom as well as in its alternate leaves, most similar to other root parasites such as Castilleja, Orthocarpus, but, unlike any of the other seven genera in the Tribe Euphrasieae that occur in eastern North America, its pedicels bear two bracteoles. Its slender seeds, as in Castilleja, Orthocarpus, have a loose and reticulate seed coat. It is the only genus in the complex that has septicidal capsule dehiscence. These plants darken in drying, as do most others of the complex.

#### Habitat and Management Implication:

My field observations of this rare plant are confined to but two populations in the Gulf Coastal Plain; however they appear to agree with label notes on specimens from other areas in the South. The Schwalbea plants are in grass-sedge systems, in moist acidic sandy loams or sandy peat loams. The tree-dotted landscape is best described as savanna, with higher elevations dominated by Longleaf Pine and deciduous scrub oak, the lower elevations boggy, sometimes Titi-Magnolia virginiana bays, sometimes Pond Pine-Pond Cypress-Nyssa biflora. Schwalbea is intermingled with a large variety of grasses in Andropogon, Panicum, Aristida, Paspalum and sedges in Rhynchospora, Scleria, Dichromena, Carex, Pimbristylis, Lachnocaulon, Eriocaulon (E. decangulare), Xyris, Aletris, Calopogon, various Juncus and a variety of colorful savanna dicots such as Eryngium, Polygala, Asclepias, Phlox, Psoralea, Erigeron, Helenium, Heterotheca (H. oligantha) are common associates. The grass-sedge complexes are interrupted by stands of shrubs in Myrica, Ilex (I. glabra, I. coriacea), Cliftonia, Vaccinium, Gaylussacia, Lyonia, Leucothoe. The savanna is fire maintained.

Such sites are well suited to plantation of Slash Pine and also are of high potential for crop agriculture. In either case they are drained and the grass-sedge system destroyed.

#### References:

- Pennell, F.W. 1935. Scrophulariaceae of eastern temperate North America. Acad. Nat. Sci. Phil. Monogr. 1, pp. 482-487.
- Radford, A.E., H.E. Ahles & C. Ritchie Bell. 1968. Manual of the vascular flora of the Carolinas, p. 261.
- Small, J.K. 1933. Manual of the southeastern flora, p. 1223.

SPECIES: Schwalbea americana L.

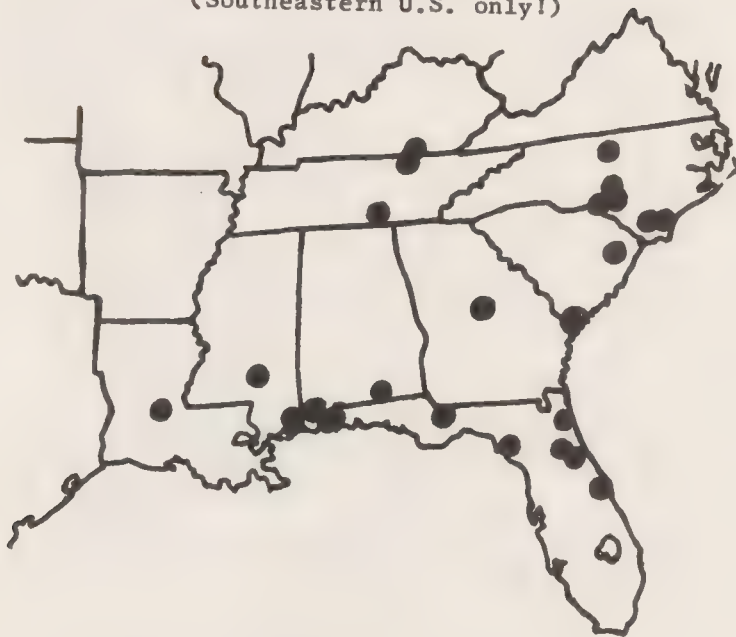
Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Do not drain!

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.



Distribution of :  
Schwalbea americana L.  
(Southeastern U.S. only!)



LENTIBULARIACEAE

Pinguicula ionantha Godfrey, Violet-flowered butterwort

Technical Description

Perennial, forming rosettes to 15 cm broad from a very short stem and a shallow, diffuse root system.

Leaves: Numerous, spreading, thinnish but succulent, somewhat involute to quite strongly inrolled, mostly elliptic to oblong, mostly 4-7 cm long, rounded, entire, the surfaces above with a covering of small glandular hairs, greenish or tinted with maroon.

Inflorescence: Peduncles 1 to several, arising progressively during flowering, erect or ascending, round in cross section, fleshy, pubescent with spreading, gland-tipped hairs, rarely longer than 2 dm., each terminating in a single flower.

Flowers: Flowering calyx about 7 mm broad, the tube short, the 5 short-oblong, glandular lobes opening laterally and enfolding the corolla base, the upper 3 longest, directed forward (upward) the lower 2 downward and outward. Corolla with a narrowly bell-shaped tube about 7 mm high, its attachment lateral, thus the base of the tube directed downward and with a narrow curved spur pointing downward and outward, and the opening directed upward: corolla limb, spreading to a flower about 2 cm across, lobes 5, nearly equal, obovate, notched at the apex to form 2, low-triangular lobes; corolla surface with limb near white or pale violet with a deeper violet "eye," the tube violet with darker violet lines, the spur often yellowish. Palate projecting forward, conic, covered with minute club-shaped hairs apically. Stamens 2, arising from upper wall of corolla tube, the anthers on forward and inward-arching, short, thickish filaments, and nearly touching. Ovary superior, nearly round, the style short, terminating in a broad, 2-lobed stigma.

Fruit: Capsule round, about 5 mm broad, thin-walled, 2-valved, enfolded at base by the now ascending calyx tube and its slightly spreading lobes. Seeds narrowly wedge-shaped, the surfaces honeycombed.

Distribution and Flowering Season

In bogs, cypress domes, depressions in flatwoods and savannas, often in shallow standing water, northwestern Florida from Franklin to Bay counties. Flowering in March and April.

Special Identifying Features

This is the rarest of southeastern Pinguicula, closest in character to P. planifolia but with rosette leaves more green (usually) and corollas paler, not as broad, the corolla segments broader and not as deeply notched.

### Habitats and Management Implication

P. ionantha is a plant of full sunlight and of high hydroperiod, acidic, bog soils. Thus logging of the cypress, pond pine, slash pine or long-leaf pine of its area would tend to encourage increase, as would fire or site preparation of any sort that reduced competing ground cover without disturbing the substrate or reducing the ground water. Drying out through drainage of the organic soils it grows on would eliminate it, as would conversion to pasture or row crop agriculture.

### References

1. Godfrey, R. K. and H. Larry Stripling. 1961. A synopsis of Pinguicula (Lentibulariaceae) in the southeastern United States. Am. Midl. Nat. 66 (2): 395-409.
2. Small, J. K. 1933. Manual of the southeastern Flora. 1232-1233.

Revised March 1980



SPECIES: #132 Pinquicula ionantha Godfrey. Violet-flowered butterwort

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Pinguicula ionantha Godfrey



LENTIBULARIACEAE

Pinguicula planifolia Chapm. Butterwort

Technical Description

Perennial, forming rosettes to 15 cm broad from a very short stem and a shallow, diffuse rootstock.

Leaves.--Numerous, spreading, thinnish but succulent, somewhat involute, mostly elliptic to oblong, 4-10 cm long, rounded or acute, entire, cuneate to attenuate to a clasping base, greenish or more often strongly maroon-tinted, the surfaces covered with minute glands.

Inflorescence.--Stems (scapes, peduncles) 1 to several, arising singly progressively during flowering, erect or ascending, round in cross section, fleshy, to 2.5 dm tall, with a scattering of short-stalked glands, each terminating in a single flower (rarely in twins).

Flowers.--Erect or slightly nodding, mostly 2-3 cm broad, showy, perfect and irregular. Sepals joined at the base, the calyx to tips 8-10 mm long, slightly 2-lipped, 5-lobed, the lobes oblong, rounded, the upper 3 lobes oblong and directed upward, the lower 2 spreading downward from the short bell-shaped but irregular calyx tube, dark green with a scattering of peg-shaped glandular hairs. Corolla with petal bases fused into a campanulate (bell shaped) spurred tube, this with the short-tubular spur directed downward and the corolla tube ca. 1.5 cm long, laterally attached to the receptacle and its opening directed upward; corolla lobes 5, spreading, lanceolate to oblanceolate, mostly fully 2-3 cm long, split often to near the middle into 2, narrowly oblong lobes, the surfaces a lively pale blue-violet, the edges thickened and papillate. Inside of corolla tube just within the throat with a raised area (palate) hairy with capitate hairs. Stamens 2, arising from upper wall of corolla tube, the anthers on forward and inward short, thickish, arching filaments and nearly touching. Ovary superior, nearly round, covered with minute glandular hairs, the style very short, the stigma broader, irregularly 2-lobed. Placentation free-central, ovules numerous. Fruit.--Capsule round, ca. 5 mm broad, thin-walled, 2-valved, enfolded at the base by ascending calyx tube and its slightly spreading lobes. Seeds narrowly wedge-shaped, the surfaces honeycombed.

Distribution and Flowering Season

In bogs, cypress domes, depressions in flatwoods and savannas, often in shallow standing water, from northwestern Florida (about the longitude of Tallahassee) westward near the present coast into Mississippi. Flowering from February into May.

Special Identifying Features

This species is distinguished best from the other five southeastern Pinguicula by its large, narrow, forked purplish-violet petal lobes and by its strongly red or purplish-tinted rosettes.

Habitat and Management Implications

P. planifolia is a typical bog plant, being most abundant in full sunlight on very moist, acid, peat or peat-sand-muck, where the competition with the predominantly grass-sedge vegetation is least. Merchantible species with which it is most associated would be slash pine, pond pine, longleaf pine and cypress, but



it is never where crowns of such would close, except in the case of the deciduous cypress. It is part of a vegetational assemblage in which periodic fires historically occur, and which probably once favored its increase. Clear cutting followed by any site preparation that did not involve strong alteration of or removal of the top soil layer would favor its increase. Ditches through bogs it frequents are usually lined with rosettes. However, once the drainage is complete enough to dry out the site, this plant disappears. Likewise, it may appear where plantations of pine are started, but disappears when tree crowns close over it, and probably through reduction of soil water and crown closure to shade. The highly organic black bog earths which it grows on are often now converted through drainage and plowing to truck crop or row crop agriculture, this perhaps the largest hazard to the species. Similarly it is lost through conversion of boggy savanna to pasture, in this case mostly through a combination of trampling, drainage, and the promotion of a closed-cover of grasses.

#### References

- Godfrey, R. K. and H. Larry Stripling. 1961. A synopsis of *Pinguicula* (Lentibulariaceae) in the southeastern United States. *Am. Midl. Nat.* 66 (2): 395-409.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1232-1233. Chapel Hill, N. C.
- Wood, C. E. Jr. and R. K. Godfrey. 1957. *Pinguicula* (Lentibulariaceae) in the southeastern United States. *Rhodora* 59: 217-330.

SPECIES Pinguicula planifolia Chapm. Butterwort

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Drainage of site destroys this species!

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Pinquicula planifolia Chapm.





Text & map by:  
Robert Kral

#### ACANTHACEAE

Justicia cooleyi Monachino and Leonard. Cooley's water-willow

#### Technical Description

Perennial mostly to 4 dm tall or less, the stems erect from decumbent bases, these from a slender, elongate shallow rhizome.

Stems.--Shoots slender, somewhat quadrangular, spreading-hairy, green or tinged with red, somewhat zig-zag, the branches few, spreading-ascending.

Leaves.--Largest toward the middle and upper stem, short-stalked, the blades ovate or lanceolate, to 5 cm long, thin, spreading, the tips acuminate, the margins entire or wavy, ciliate, the bases short-attenuate, the surfaces bristly-hairy.

Inflorescence.--Flowering branches usually with a long basal stalk, this forking once to produce 2 spikes, the flowers several, equally distant along a zig-zag, finely glandular-hairy axis.

Flowers.--Perfect, zygomorphic, each with a few linear, sepal-like bracts about as long as the sepals. Sepals 4, linear, 3-4 mm long, finely hairy, narrowly acute, erect. Petals fused, corolla 7-8 mm long, bilabiate, bright lavender-rose, the tube ca. 4.5 mm long, the lower lip longest, medially mottled lavender and white, 3-lobed, the upper lip short-oblong, with an erect, emarginate tip. Stamens 2, attached to corolla, the anther sacs 2 at each filament tip and of different sizes. Ovary superior, bicarpellate, the style elongate-lineal. All parts save stamens and style glandular-pilose.

Fruit.--Capsule broadly club-shaped, finely hairy, ca. 1.2 cm long, flattened, the 2 valves separating to reveal a few round, flattened, dark-brown seeds, the seed coat densely villous, the hairs bifurcate.

#### Distribution and Flowering Season

J. cooleyi has been found thus far only in middle peninsular Florida (2 counties), mostly in the Oligocene "Island" and the sparse information available indicates a flowering period from August through December, or November through March

#### Special Identifying Features

Monachino and Leonard (1959) indicate that the closest affinities of this taxon are with plants either in Mexico or Ecuador (Galapagos). The only other *Justicia* sharing habitat with it is J. ovata (Walt.) Lindau, from which it is easily distinguished by its thinner leaves, its generally pilose-pubescent surfaces (often mixed with gland-tipped hairs), its much smaller, much brighter colored, corollas. Seeds of J. cooleyi have a unique "anchor-tipped" trichome.

#### Habitat and Management Implications

This species is found both in high hardwood or hardwood-pine hammock, along small gullies or meandering streams, on on low rises in swamp woodland and hammock, is normally rooted in fine sandy loams or silty clay loams that range from moist to seasonally wet. It is usually in dense to light shade.

In the overstory are mostly southern mesic species such as southern magnolia, black gum, sweet gum, live oak, willow oak species, pignut hickory, red bay, occasional loblolly pine, frequent cabbage palmetto on the higher ground with red maple, black gums, and green ash, together with red gum, more common in the lower sites. The most common understory is a mix of Myrica, Carpinus, Ostrya, Cornus, and (especially) yaupon holly. Associated herbaceous plants include many species of ferns in genera Athyrium, Polypodium, Nephrolepis, Asplenium, Dryopteris, frequent carices, several genera of woodland grasses in Panicum, Chasmanthium, Poa, Oplismenus, several Polygonum, Urticaceae, Mitchella, numerous shade species of composites and Commelinaceae, and several sorts of herbaceous vines.

Most of the presently known area J. cooleyi is known from has been logged over at least once and the species persists, perhaps is even increased, by creation of less heavy shade such as would be done by removal of some of the pine, evergreen magnolia and oak. Some of its habitat near Brooksville has doubtlessly been destroyed by clear cutting for either agriculture or housing. This, together with the complete destruction of habitat because of mining of underlying phosphate, has probably comprised the greatest danger to continuance of the species. I have observed areas where woodlots have been "opened" to improve pasture and have seen an abundance of this Justicia in the light shade, even though many of the plants show browse damage.

To summarize, J. cooleyi is probably not much threatened by selective cutting of the hardwood overstory so long as the soil structure itself is not radically altered. Clear cutting would probably remove the species, in that it appears to be moderately shade-dependent or at least dependent upon a shade-and-forest-litter-engendered soil type. Limited pasturing may not be harmful, except for damage by trampling. Perpetuation of J. cooleyi seems to depend on maintenance of some mesophytic overstory. Site preparation involving drastic soil disturbance and pine plantation would destroy this sort of plant.

#### References

- Long, R. W. 1970. The genera of Acanthaceae in the southeastern United States. *Journ. Arn. Arb.* 51: 257-309.
- Monochino, J. and E. Leonard. 1959. A new species of Justicia from Florida. *Rhodora* 61: 183-187.
- Small, J.K. 1933. Manual of the southeastern flora, p. 1231. Chapel Hill, N.C.

Revised Oct. 1962

SPECIES Justicia cooleyi Monachino & Leonard

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X	X	
Damage								
No Lasting Effect								*
Beneficial if Done Properly					X			

Other Comments: \*If area is lightly pastured

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Justicia cooleyi Monachino & Leonard



ACANTHACEAE

Justicia crassifolia (Chapman) Small. Thick-leaved water-willow

Dianthera crassifolia Chapman

Technical Description

A smooth perennial.

Stems: The shoots one to several, erect, to 4 dm tall, rounded-angled or slightly winged, simple or few-branched, from a system of pale, slender but fleshy rhizomes.

Leaves: Opposite, fleshy, mostly erect or slightly spreading, the lowermost short, linear or spatulate, the largest at the middle or upper part of the stem, linear-elliptic, narrowly linear, or narrowly linear-oblan-ceolate, narrowing gradually to the tip, this narrow but blunt, margins entire, bases gradually narrowed to the short petiole, and with only the strong midrib evident.

Inflorescence: Flowers few, but showy, sessile toward the tips of long nearly erect peduncles, these from the axils of the upper stem leaves, and each with a set of short, linear bracts just beneath the sepals.

Flowers: Sepals 5, linear-lanceolate, about 1.5 cm. long, finely-serrate, erect. Corolla with petals fused, very irregular, 3-4 cm long, 2-lipped, with the lower lip longer than the corolla tube and with 3 spreading, nearly equal lobes, bright lavender with deeper purple-and-white mottlings medially, the upper lip spreading upward, shorter than the lower, oblong, the tip emarginate. Stamens 2, attached to corolla, the anthers separate toward the filament tip. Style elongated beyond the corolla tube, the stigma tip 2-lobed.

Fruit: A spatulate-shaped, flattened capsule about 7 mm long, splitting into 2, spreading valves and producing several round, blackish, flattened seeds.

Distribution and Flowering Season

This species appears to be confined largely to the wet flatwoods of northwest Florida, the gulf portion of northern peninsular Florida and to gladey wet areas in southern peninsular Florida. It blooms throughout the growing season.

Habitats and Management Implication

J. crassifolia is mainly found in the wetter areas of slash pine-saw palmetto flatwoods, usually on black sandy peats or sandy peat mucks. Its main herbaceous associates are grasses, sedges, Rhexia, Xyris, Hypericum, Drosera, Lycopodium, Ludwigia, various compositae. Its main competitors are probably grasses, sedges, together with shrubby hypericums,

hollies, various ericaceous plants that encroach upon the clearings it frequents. It appears to be part of the herb complex that is favored by heavy forest fire; this tends to create openings for such a shade-intolerant species to develop in and also reduces the shrubby understory which would tend to crowd and shade it out. Most specimens show the burnt stubs of old shoots, evidence to the fact that the plants respond vigorously and bloom well as a result of such stimulus.

Selective logging would tend to increase the species by creating openings. Clear cutting or site preparation unaccompanied by major soil disturbance would also tend to increase the species. However, in that this is a plant of high hydroperiod soils, any site preparation involving a lowering of the fluctuating, intermittently flooding water table, would eliminate the species.

#### References

- Long, R.W. 1970. The genera of Acanthaceae in the southeastern US. Journ. Arn. Arb. 51: 257-309.
- Small, J.K. 1918. Dianthera crassifolia. Addisonia 3: 79-80., pl. 120.
- \_\_\_\_\_ 1933. Manual of the southeastern flora, p. 1231.

Revised March 1980



SPECIES: #107 Justicia crassifolia (Chapman) Small. Thick-leaved water-willow

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Justicia crassifolia (Chapm.) Small



ACANTHACEAE

Justicia mortuifluminis Fernald

J. umbriatilis Fernald (1941), not S. Moore,  
Journ. Bot. 11: 216. (1913)

Status: Endangered?

Technical Description:

Perennial, strongly clonalizing herb, perennating by elongate, deepset, forking, pale-stoloniferous rhizomes, these at first ca. 3 mm thick, later thickening to 4-6 mm.

Stems: erect or with short-decumbent bases, to 6 dm tall, stiffish, simple or branching from lower nodes, slender, proximally with brown or purple tints, subterete, upwardly becoming angulately sharp-ridged, the ridges decurrent from the petiole bases, the surfaces light yellow-green, smooth save in inflorescence where ridges scabro-puberulent.

Leaves: opposite, on 7-11 nodes, estipulate, the lowermost smallest, more spreading, sessile or short-petiolate, the largest at mid-stem or above, erect or ascending, narrowly elliptic, oblanceolate or elliptic-oblong, narrowly acute or acuminate, the apex narrowly rounded, the margin entire or undulate, scabro-ciliate, the base attenuated nearly to petiole base, the surface smooth, dark green above, paler beneath, the venation pinnate-arcuate, the midrib above medially grooved, the veins below somewhat raised.

Inflorescence: Most mid and upper leaves bearing in their axils arching-erect peduncles, these slender, angulately ribbed, the lowest longest, 10-15 cm long, the uppermost as short as 3-4 cm long, bearing apically compact, subcapitate, strongly bracteate spikes, the bracts in pseudowhorls at base of flowers, triangular, greenish, shorter than the calyx tubes, the flowers suberect and strongly overlapping.

Flowers: bisexual, the corolla very zygomorphic; sepals 5, subequal, at anthesis ca. 1 cm long, joined at base into a short, subscarious tube, the lobes linear-elliptic, erect or slightly spreading, narrowly and sharply acute, green with only midnerve evident, the margins narrow, pale, minutely scabrid; corolla variable in length and lobation but mostly ranging from 1.0-1.5 cm long, strongly bilabiate, the tube ca. 8 mm long, the upper lip oblong, arching forward, 5-6 mm long, apically broadly rounded, emarginate or subtruncate, the lower lip 7-9 mm long, broadly obtriangular, spreading downward, strongly 3-lobed, the central lobe slightly longest and widest, the laterals oblong-ovate or oblong-elliptic, diverging at a slight angle, the surface smooth, pale lilac with darker veins save for the nearly white tube base and the upper medial surface of the midlobe of the lower lip, this raised to a palate, which is white, strongly mottled peripherally with deep lilac spots and lines; stamens 2, epipetalous, the white slender flattened filaments borne laterally on the corolla tube on line with the lip sinuses, arching somewhat up under the upper corolla lip, the anther connective very dilated, laterally flattened, lanceolate-curved, the 2 anther sacs linear, one borne low on the connective edge and opening inward, the other borne supapically on the outer edge of the connective



and opening away from the stigma; ovary superior, bicarpellate, narrowly lance-ovoid, the slender style terminal, arching up under the upper corolla lip and at the level of the anthers producing 2 low stigmatic lobes, 1 terminal and 1 subterminal-lateral.

**Fruit:** Ripe capsule 1.2-1.4 cm long, the base with a laterally flattened stipe ca. 5 mm long, the body broadly oblong, dorsiventrally flattened (parallel to partition), acuminate, the wall greenish-brown, firm, splitting into 2 valves loculicidally; seeds few, orbicular-reniform, laterally flattened, ca. 3 mm wide, dark brown, minutely pebbled, the funiculus with a narrow lateral extension curled about the lower edge of the seed.

#### Distribution and Flowering Season:

Alluvial woodlands, quiet backwater sloughs, Coastal Plain, southeastern Virginia; flowering from June through July.

#### Special Identifying Features:

Fernald's description of this "species" produces an image of what an ideal hybrid between *J. americana* and *J. ovata* would be like. The common Water-willow, *J. americana* is taller (sometimes to 1 meter tall), stouter-based, stouter rhizomed, the rhizomes shallow and producing slender surficial stolons, the leaves are narrower, the inflorescence is very dense, headlike, produced on very elongate peduncles, the corollas are smaller, with the upper lip somewhat spreading-recurved, the lower lip has the median lobe constricted toward its base, the laterals are more spreading; *J. ovata* on the other hand is lower, the rhizomes more slender, the leaves broader, mostly broadly elliptic, ovate or obovate, the inflorescences are fewer-flowered with the flowers more loosely arranged, the lower blooms more distant as fruit forms. Seed characters appear to be intermediate. It is of some interest to note that *J. mortuifluminis* has been found along the Blackwater and Nottoway Rivers in southeastern Virginia, the northernmost area for *J. ovata*, but also where some suitable habitat for *J. americana*, which is far the most ubiquitous of these wetland taxa. I have inspected several sites for what keys to *J. mortuifluminis* and note that some clones agree well with the original description whilst others grade toward either *J. americana* or to *J. ovata*. The situation appears to be that, where *J. americana* and *J. ovata* come into contact along the slow, tidally influenced rivers of southeastern Virginia, intermediate morphologies have developed, and these appear to be back-crossing with parental types. This will make an interesting proof if such has not already been done. It is also worthy of note that morphologies similar to *J. mortuifluminis* appear in the Gulf Coastal Plain, where *J. ovata* and *J. americana* also overlap occasionally. It would seem that the taxon is weak.

#### Habitat and Management Implication:

*J. mortuifluminis*, as the name implies, is found in deadwater swamps. Particularly good sites for it are still to be found in the Nottoway system around Franklin. The river itself is typical of a rather slow flowing stream, sinuous, wine-tinted, in places with a broad floodplain with large shallow-bottomed sloughs interrupted by frequent natural levees as well as by slow-flowing tributary streams.

The substratum is in places silty muck, in others a fine silty sand, in any event overlying sandy alluvium. There are large beds of Saururus, Sagittaria, Scirpus, Rhynchospora, Pontederia, Sparganium, Leersia, Glyceria, Panicum, Peltandra, robust carices, Polygonum, Penthorum, etc. The overstory is prevalently cypress-tupelo, with Nyssa biflora, Acer rubrum, Liquidambar, Salix, Populus, Fraxinus caroliniana, F. pensylvanica, F. tomentosa, Platanus, Carya aquatica, various willow oaks, Overcup Oak, Persimmon with an understory of Itea, Cephalanthus, Sambucus, Cornus, Viburnum, etc. The Justicia frequents frequently inundated first bottom, forms particularly large stands where tributary streams course through the bottoms or along cutoff sloughs. It is definitely a shade plant.

This habitat suffers most from clearcutting of the cypress and hardwoods. Following a wholesale cut of such bottoms there is often a strong shift of species, evinced by a rapid increase of rank, weedy herbaceous and woody plants, turning such places into jungles in which the Justicia may no longer grow.

#### References:

- Fernald, M.L. 1941. Another century of additions to the flora of Virginia. *Rhodora* 43: 635-659.
- \_\_\_\_\_. 1942. Justicia mortuifluminis, in *Rhodora* 44: 92.
- \_\_\_\_\_. 1950. Gray's manual of botany, ed. 8, pp. 1308-1309.

SPECIES: Justicia mortuifluminis Fernald

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy	NA	NA	NA	NA		X	NA	
Damage					X			
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.



Approximate Range of:

Justicia mortuifluminis Fernald



PLANTAGINACEAE

Plantago cordata Lam. heart-leaved plantain

Technical Description

Rosulate, glabrous perennial from a thick (2-3 cm) caudex with spongy, thick, shallow, simple or branched roots, these up to 1 dm or more long.

Leaves.-- Numerous at plant base, erect or spreading, (1-) 2-6 dm long, 1/5 - 1/3 petiole, the blades, elliptic to (mostly) ovate, the larger ones mostly 1-2 dm long, to 1.5 dm wide, the tips acute to obtuseangled, the margins entire to undulate, sinuate, or coarsely and irregularly saliently dentate, the base cordate to truncate, then attenuated on the upper petiole; petioles strongly ribbed, though spongy, pale green or tinged with maroon, toward base somewhat equitant, the margins thin, broadening to a broadly clasping base; leaf surfaces a dullish green, the prominent nerves mostly 5-7, parallel on the petiole, the laterals spreading arcuately in the blade.

Scapes.-- Erect, or ascending, 1-4 per plant, mostly 2-6 dm long, stiff but spongy, terete, fistulose (hollow), pale green often with tinges or purple toward base, the flowers borne in the upper 1/2-1/3.

Inflorescence.-- Spikes narrowly linear, erect, many-flowered, the flowers irregularly, somewhat loosely, arranged (interrupted) along the fleshy axis, each clasped by a broadly ovate, green, scarious-margined, rounded bract about as long as the calyx (ca. 3 mm long).

Flowers.-- Sepals 4, distinct, erect, scale-like, oblong or ovate, 2-3 mm long, rounded-tipped, medially green with broad, pale, scarious margins; petals 4, fused, papery, the corolla salverform, the tube ca. 3 mm long, the spreading, broadly ovate-triangular lobes ca. 1 mm long; stamens usually 4, epipetalous, alternating with petals, the slender filaments exerted, the reddish-brown, short-oblong, apiculate, short-spurred anthers basifixed, ca. 1.5 mm long; ovary superior, carpels 2, style simple, linear, exerted.

Fruit.-- Capsule ovoid, smooth, thin-walled, ca. 4 mm long, 2-chambered circumsessile; seeds 2-4/capsule, ellipsoidal, 3.0-3.5 mm long, dark brown.

Distribution and Flowering Time

Swamps, shallows and banks of creeks, various provinces in eastern North America from southern Ontario, Michigan and Wisconsin southward, extremely rare in the southeastern area, being scattered in western and Piedmont Virginia, Kentucky, North Carolina (Piedmont), northwestern Georgia, northern Alabama, southwestwardly to Louisiana; in southeastern area flowering mostly in April.

Special Identifying Features

In the southeastern area, P. cordata is most similar to P. major, P. rugellii, differing from both in its much greater size, stoutness of caudex, fistulose scapes, more scattered-flowered spike. Seeds are shed and spikes dying back by the time the other two species are producing their long-persistent spikes.

#### Habitat and Management Implications

P. cordata is a species of very wet, usually shaded sites, generally being found in and along shallow streams of ravines or swamp woodlands. It is normally rooted in muck or wet, silty-sandy or gravelly substrates, these often accumulated over slates, shales, sandstones or limestones. The streams in or along which it grows are clean and healthy, the plants appearing not to persist in polluted situations. Steyermark (1963) notes that the foliage is edible, thus pasturing of the wooded banks it frequents must have a negative effect. Clearcutting of the hardwood overstory would likely produce an adverse effect through altering runoff patterns, aggravating flooding and siltation, and otherwise disturbing the substrate.

#### References

- Godfrey, R.K. 1961. Plantago cordata still grows in Georgia. *Castanea* 26: 119-120.
- Harper, R.F. 1944. Notes on *Plantago* with special reference to P. cordata. *Castanea* 9: 121-130.
- Lamarck, J and J. Poiret. 1791. *Tableau encyclopedique et methodique des trois regnes de la nature. Botanique. I: 338. Paris.*
- Small, J.K. 1933. *Manual of the southeastern flora*, pp. 1244-1247. Chapel Hill, N.C.
- Steyermark, J.A. 1963. *Flora of Missouri*, pp. 1380-1386. Ames.



SPECIES Plantago cordata Lam. heart-leaved plantain

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA		x	NA	x
Damage								
No Lasting Effect					x			
Beneficial if Done Properly								

Other Comments: mechanical site preparation may effect indirectly  
if raw substrate exposed by such methods washes  
down into the small streams, unless a "buffer"  
zone is left along streams

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Plantago cordata Lam.



RUBIACEAE

Houstonia montana (Chickering) Small

Hedyotis purpurea (L.) Hook. var. montana (Chick.) Fosb.

Status: Endangered

Technical Description:

Perennial, low, forming loose tufts by short, ascending leafy lateral shoots which overwinter and by slender, forking, superficial rhizomes, the roots shallow, diffuse-fibrous.

Stems: very slender, but stiffish, the bases decumbent, often rooting at lower nodes, erect or spreading above, mostly 1.0-1.5 dm long (-2.0 dm), some strict, some few-branched, branching from mid and upper nodes and fertile, some sterile, bearing only leaves; main axis ca. 1 mm thick, subquadrate, the angles narrowly winged or sharp, smooth, deep green or tinged with purple, the nodes close proximally, few and well separate at mid-stem, close in the inflorescence.

Leaves: opposite, decussate, stipulate, the stipules scarious, triangular, the blades mostly elliptical, narrowly ovate or broadly lanceolate, firm, spreading, sessile or short-petiolate, the larger blades 1.5-2.0 cm long, apically narrowly rounded, obtuse or broadly acute, the margins entire, minutely ciliate-scarid, the base rounded or cuneate, then abruptly attenuate (lowermost leaves much smaller, mostly spatulate, mostly withered by anthesis). Upper bracteal leaves usually not much reduced and often partly concealing the inflorescences. Surface above deep green, papillate, only the midnerve evident, the lower surface smooth, pale green.

Inflorescence: terminal, either a single 3-flowered subsessile cyme or with the lateral branches terminating in similar cymes, in any case few-flowered, and the the inflorescence base often concealed by bracteal leaves.

Flowers: bisexual, regular, the sepals 5, united at base to form a campanulate tube ca. 1.5 mm high, the ascending lobes oblong, ca. 2.0-2.5 mm long, acute, entire, the surface pale green; corolla 5-parted, salverform, a lively pale but bright purple, the narrowly funnelform throat to 8 mm long, the slightly spreading limb with lobes triangular, ca. 5 mm long, the surface externally smooth, internally with lobes pilosulous with small, pale, soft, short, sharp-tipped or claviform purple-tipped hairs, the tube simply pale-pilosulous; stamens 5, alternating with the corolla lobes, epipetalous, the purplish slender filaments arising just under the lobe sinuses and arching slightly inward, 0.5-0.7 mm long, the anthers linear-excurved, extrorse, ca. 1 mm long, pale blue; ovary bicarpellate, half-inferior, smooth, the slender terminal style reaching barely midway up the corolla tube, its stigma capitate, papillose.

Fruit: capsule very broadly obovoid, nearly as wide as long, slightly compressed, bilobate, emarginate, ca. 3 mm high, about 2/3 covered by the tube of the persisting calyx, the cyme and fruit stalks somewhat elongating as fruit matures; seeds numerous, axile, irregularly blocky-angulate, pebbled, nearly black.

Distribution and Flowering Season:



Moist granitic summit elevations, cliffs and bluffs, Blue Ridge, Roan Mountain, North Carolina (and Tennessee?); flowering mostly in July and early August.

#### Special Identifying Features:

Conventional treatments of this genus whether it be called Houstonia or Hedyotis have H. montana as a variety of H. purpurea. Yet, though it is true that H. purpurea is polymorphic, H. montana is so distinctive as to cause any observer who has much familiarity with the range of variation of H. purpurea to reconsider the taxonomy. H. purpurea in all its forms is taller, has either longer or broader leaves (or both!), has a much more floriferous inflorescence and much smaller flowers (corollas rarely much over 7 mm long), the sepals of which are narrower. H. purpurea proper is often found at high elevations in the Blue Ridge, even around some high balds, and yet retains characters distinct from the Roan Mountain endemic.

#### Habitat and Management Implications:

H. montana is indeed a very rare herb! It is presently known only from the North Carolina side of Roan Mountain and is scarce there. The ideal habitat appears to be a moss-sedge-grass mantle that carpets a thin, moist to wettish, black humified fine sand over outcrops of granitic rock, steep slopes and bluff ledges, or the rocky detritus around outcrops. Its herbaceous associates are mostly high mountain carices and grasses, with Houstonia serpyllifolia, Potentilla tridentata, Saxifraga michauxii, Heuchera villosa, Geum radiatum, Gentiana, sometimes the rare Solidago spithamea, and various ferns and fern allies. Sometimes it may be found in areas of grass bald where Alnus, Rhododendron, Leiophyllum and other heaths are invading, and doubtlessly it then gives way to shade and root competition. The best chance of finding it is to pick one's way along the narrow ledges of steep, moist bluffs along the spruce-fir summit ridges. In such places it has its least danger of being trampled by hikers or swamped by invading woody vegetation. Factors for its continuance are much the same as for Geum radiatum. It needs small, cool, moist cleared areas. Where these are too level or have deeper soil layer, successional pressure is toward woody invaders unless some factor such as clearing or burning maintains the openings. Where the country is steepest, it may be lost through rockslide or slipping of soil mantles, but these forces also create new area for it to occupy. Fortunately the known small populations are on public parkland, and some are harboring in areas too steep or risky for most people to tread.

#### References:

- Fosberg, R. 1954. Notes on plants of the eastern United States. *Castanea* 19: 25-37.
- Small, J.K. 1903. Flora of the southeastern United States, 1325, 1338.
- \_\_\_\_\_. 1933. Manual of the southeastern flora, pp. 1253-1256.

SPECIES: Houstonia montana (Chickering) Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy								
Damage No Lasting Effect		NA	NA	NA			NA	
Beneficial if Done Properly					X	X		

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Houstonia montana (Chickering) Small





RUBIACEAE

Hedyotis nigricans (Lam.) Fosb. var. pulvinata (Small) Fosb.  
Mat-forming narrow-leaved bluets  
Houstonia pulvinata Small  
Houstonia nigricans (Lam.) ern. var. pulvinata (Small) ern.

Technical Description

Low, compact, much-branched, essentially smooth perennial herb, forming circular mats from a woody, branched rootstock.

Stems.-- Mostly 1.0-1.5 dm high, numerous, low-spreading or arching, prolifically branching from sub-woody older stem bases, pale green, lustrous, angled or quadrangular (longitudinally narrowly grooved below the stipules).

Leaves.-- Opposite, stipulate, the stipule an erect, scarious, triangular erose or lacinate scale ca. 1 mm high; blades spreading or ascending, sessile, linear, linear-oblongate, or elliptic-linear, 0.8-1.2 cm long, mostly 1-2 mm wide, acutish, the margins revolute, the upper surface pale green, the lower surface paler, only the medial vein evident; leaves largest at midstem, gradually reduced up the stem into inflorescence.

Inflorescence.-- A compound system of small, pedunculate cymes arising from most of the upper leaf axils, thus the whole plant at anthesis because of its many branches a cushion of lavender bloom.

Flowers.-- Regular, bisexual, erect on short, stiffish, often maroon-tinted pedicels to 1.2 mm long; calyx at anthesis funnelform, ca. 1.5 mm. high, the 4 lobes lance-ovate, ca. 6-7 mm long, erect, acute, the calyx surface green, smooth or sparsely strigose; corolla about 5 mm long, narrowly somewhat funnelform, bright lavender, the cylindrical tube ca. 2 mm long, expanding to the short, funnelform throat ca. 1 mm long, the 4 lobes slightly spreading-triangular, 2.0-2.5 mm long; inner corolla surface densely villosulous, outer surface smooth or sparsely strigose on the throat; stamens 4, epipetalous, the anthers oblong, ca. 1 mm long, alternating with the corolla lobes, nearly sessile ca. 1 mm below the corolla sinus; ovary nearly round, part inferior, smooth, ca. 0.5 mm high, 2-carpellate, the style erect, linear, ca. 5 mm long, densely minutely puberulent.

Fruit.-- Calyx tube enlarging in fruit to 2 mm, thus longer than the calyx lobes; capsule ca. 2.5 mm long, projecting slightly beyond calyx tips, obovoid, nearly 3 mm long, somewhat compressed, 2-lobed, and keel-margined; seeds several/locule, ca. 0.5 mm long, irregularly elliptic-oblong, nearly black, muciculate.

Distribution and Flowering Time

Sandy clearings, dunes, coquina reefs along the coast, eastern peninsular Florida; flowering from May intermittently through summer.

Special Identifying Features

This variety is to be distinguished from the other varieties of this widespread, polymorphic species by its consistently lower, mat-forming habit. The dense

hairiness of the inner surface of its corolla sets it off from its nearest variety, var. filifolia, a taller, more erect, more sparse plant with longer, narrower leaves which is from sand dunes and coastal sandy areas from the tip of Florida along the Gulf of Mexico to Texas.

#### Habitat and Management Implications

"Typical" var. pulvinata is found on and near the east coast of Florida, usually on or around coquina sands or old limestone reefs. If inland it is never far inland and there usually around coquina rock outcrops or sandy clearings near these outcrops. The habitat is dry, may have various Opuntia, Monarda punctat, Gaillardia pulchella, Ipomopsis rubra, Phyllanthus, Cenchrus, Helianthus debilis, etc. Overstory, of forest, surrounding clearings or nearby, is mostly pine, in some places sand pine mingling with various live oak species, in others longleaf pine mixed with slash pine, generally with an understory mostly of ericads and palmetto. The main threat facing the variety at present is from overdevelopment of the coastal areas for retirement and vacation housing and for commerce. Inland where the plants are found in small clearings, the management of pine is usually clearcutting followed by mechanical site preparation and planting to slash pine. This destroys the small clearings in which the Hedyotis grows.

#### References

- Fosberg, F.R. 1954. Notes on plants of the eastern U.S. *Castanea* 19: 25-37.
- Small, J.K. 1899. Undescribed species from the southern U.S. *Bull. N.Y. Bot. Gard.* 1: 278-290.
- \_\_\_\_\_, 1933. *Manual of the southeastern flora*, pp. 1253-1256. Chapel Hill.

SPECIES Hedyotis nigricans (Lam.) Fosb. var. pulvinata (Small)  
Fosb. Mat-forming narrow-leaved bluet

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	X	X	X			X	
Damage								
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Hedyotis nigricans (Lam.) Fosb. var. pulvinata (Small) Fosb.



CAPRIFOLIACEAE

Viburnum bracteatum Rehd. Southeastern viburnum

Technical Description

Tightish-barked shrub to 3 meters, the branches spreading-arching, the branchlets tan, terete, slender, smooth, aging to gray-brown.

Leaves.--Deciduous, opposite, the petioles short, usually less than 2 cm, spreading-ascending, greenish-brown or reddish-brown, sparingly hirsute with glandular hairs, the stipules persistent, pale red-brown, linear, ciliate, 3-10 mm long, the blades elliptic to broadly ovate or suborbicular, (4-) 6-12 cm long, acute to short-acuminate, rather remotely sinuate-dentate (ca. 1 tooth/cm), the base rounded or cordate, the upper surface a rich, dark green, smooth, the lower surface paler, pilose-hirsute along the pinnate veins, otherwise smooth or glabrescent.

Inflorescence.--Cymes erect, terminal on glandular peduncles 5-6 cm long, the primary cymal branches several, glandular, at junction with branchlets producing conspicuous greenish bracts, these narrowly oblong to linear, 6-12 mm long, glandular, ciliate, the whole inflorescence 4-6 cm broad, showy, white.

Flowers.--Regular, bisexual, bracteolate, the bracteoles scarious, triangular, pale, ca. 1.0-1.5 mm long, the calyx limb cupuliform, ca. 1 mm deep, irregularly shallowly rounded-lobed, scarious, sparingly ciliate; corolla rotate, ca. 8 mm wide across the limb, 5-lobed, the lobes broadly obovate or nearly round, ciliate, externally sparsely puberulent; stamens 5, epipetalous, the rounded, pale yellow anthers long-exserted; ovary inferior, the body with its covering perianth at anthesis ellipsoidal, greenish, granular.

Fruit.--Drupe when ripe blue-black, oval or ovoid, ca. 1 cm long, the sparingly grooved, somewhat flattened stone ca. 8 mm long.

Distribution and Flowering Season

Calcareous-rocky bluffs, ledges, cliffs along the Coosa River, northwestern Georgia, northeastern Alabama; flowering mostly in May.

Special Identifying Features

In the southeast, this shrub is most similar to two species, V. rafinesquianum Schult., and V. molle Michx., and is probably most closely allied to the former, differing from it mainly in its somewhat longer petioles, its leaves with hairs beneath confined to the main veins (in V. rafinesquianum the whole lower

surface is pubescent, save in var. affine (bush) House) It differs from V. molle in its usually smaller, more remotely toothed leaves, smoother foliage, it persistent and more conspicuous bracts and stipules, and in its tighter bark (in V. molle the bark exfoliates in small plates!).

#### Habitat and Management Implications

V. bracteatum is part of the shrub understory in open deciduous woodland foresting the steep, calcareous bluffs along the Coosa River. The overstory dominants include Quercus muhlenbergii, Q. shumardii, Q. rubra, Ulmus americana, U. rubra, Carya ovata, C. cordiformis, C. carolinae-septentrionalis, Acer saccharum, Fraxinus americana, F. quadrangulata, etc. Understory and shrub species include Carpinus, Ostrya, Cercis, Amorpha fruticosa, Cornus florida, Hamamelis, Philadelphus, Ilex decidua, Bumelia lycioides, etc. Rooted in the deeper pockets of soil are such herbs as Hepatica, Sanguinaria, Thaspium barbinode, T. trifoliata, Zizia aptera, Thalictrum dioicum, Heuchera americana (with H. villosa on the rocks), Coreopsis auriculata, Trillium cuneatum, Phlox divaricata, etc. Upslope the overstory becomes one of oak-hickory-pine, with an understory primarily of Cornus florida and Vaccinium arboreum. Three other Viburnum, V. rufidulum, V. acerifolium and V. rafinesquianum are present, the latter two with a slight overlap in flowering time, but the peak of flower for V. bracteatum is definitely after the others.

The timber comprising the overstory is merchantable and some has been cut, but the steep terrain tends to protect these woods from intense use and certainly prohibits crop agriculture or foraging except by goats. The main threat to this shrub is from quarrying of the dolomitic limestones. This has destroyed most of the type locality along the Coosa at the southern outskirts of Rome, Georgia, and has wiped out the Alabama locality known to Roland Harper. Perpetuation of the species depends on the setting aside of some of the bluff country this shrub is known to frequent. Since there are many localities of steep limestone bluffs along and near the Coosa River where the plants should be found, further search for it should be conducted and likely areas purchased and preserved.

#### References

- Rehder, A. 1903. Viburnum, in Sargent's Trees & Shrubs, Vol. I.  
\_\_\_\_\_. 1904. Preliminary lists of New England plants.  
Rhodora 6: 54-61.  
\_\_\_\_\_. 1940. Manual of cultivated trees and shrubs hardy  
in North America. New York.  
Small, J.K. 1933. Manual of the southeastern flora, pp. 1270-1272  
Chapel Hill.



SPECIES Viburnum bracteatum Rehd. southeastern viburnum

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA			NA	
Damage								X
No Lasting Effect						X		
Beneficial if Done Properly					X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Viburnum bracteatum Rehd.



CAMPANULACEAE

Lobelia gattingeri A.Gray

L. appendiculata A.DC. var. gattingeri (Gray)McVaugh

Status: Threatened

Technical Description:

Annual or biennial, bolting in late spring from an overwintering (rarely oversummering) rosette, the roots diffuse and slender.

Stems: single or few, or several, erect or ascending, simple, branching only from very lowest nodes or in the inflorescence, (1-) 2-5 (-7) dm high, terete and strongly ribbed, or multiangulate, the angles below the leaf margins low-winged, smooth, pale yellow green or suffused with purple distally.

Leaves: alternate, the largest in the rosette, (this sometimes withered by anthesis) sessile or nearly so, oblanceolate to oblong-ovate, obovate or broadly spatulate (1-) 2-6 cm long, smooth, pale green or tinged with purple, apically rounded, marginally entire, sinuate, distantly denticulate, serrate or basally variously toothed; cauline leaves numerous but rarely overlapping, progressively shorter up the stem.

Inflorescence: flowers many, spreading, spirally arranged, distant below, close above, in narrow, stiffish, indeterminate, bracteate racemes  $1/2$ - $3/4$  the total plant height, the bracts grading into upper stem leaves below, progressively smaller upward in raceme, mostly narrowly lanceolate to lance-linear, mostly 0.5-1.0 cm long, entire or with a few narrow teeth or glandlike denticles basally, the pedicels erect, mostly 3-5 mm long, granular, minutely 2-bracted at base.

Flowers: very showy at anthesis, bisexual, irregular, 1.0-1.5 cm long; calyx smooth, ca. 4.0-4.5 mm long the tube campanulate, ca. 2 mm long, slightly dilated at base dorsally, 10-nerved, thin, pale green tinged with purple or violet, the 5, erect or slightly spreading lobes subequal ca. 2.5 mm long, subulate, entire, lacking auricles or auricles minute; corolla strongly bilabiate, the tube pale blue with deep blue lines, ca. 5 mm long, slightly dilated to an oblique orifice, and slit (fenestrate) above, the upper lip with 2, erect and spreading, narrowly triangular teeth, the lower lip longest, projecting forward and downward, trilobed with 3 subequal, oblong, obtuseangled, spreading, flat lobes, a deep bright blue and smooth save for a villosity on the lip base and lower side of corolla tube internally; stamens 5, erect, bent slightly at apex, ca. 5 mm long, the flattened filaments pale blue, the gray-blue anthers forming a cylinder, the connective edges and anther tips white-strigillose; ovary inferior, bicarpellate, the numerous ovules axile, the style linear, dilated and with a tuft of hairs apically at the level of the anther apex.

Fruit: a loculicidal, thin-walled, ovoid capsule, its apex barely exceeding the calyx tube and with 4, incomplete cells; seeds pale red-brown, ellipsoidal, slightly flattened, finely cancellate and irregularly rugulose.



#### Distribution and Flowering Season:

Seasonally moist limestone clearings and glades, middle Tennessee and (?) northern Alabama; flowering mostly from mid May through June, intermittently till frost.

#### Special Identifying Features:

This smallish flowered but showy plant is nearest L. appendiculata Lam., a taller, larger-leaved plant with a distinct range, primarily east Texas north to Oklahoma, Kansas, (?Illinois) and eastward into the Coastal Plain of Alabama. L. gattingeri has entire or rarely distantly glandular-denticulate, mostly exauriculate (rather than glandular-ciliate and auriculate) calyx lobes, and deeper blue corollas. Recent authors appear to be inclined to treat the two as varieties, though this may be inconsistent with general concepts of species in the genus.

#### Habitat and Management Implication:

L. gattingeri is abundant locally on thin, seasonally moist, sticky clays such as form on and around flat-bedded limestones. It is a plant of full sun or light shade, associated with other plants of open limestone glades in middle Tennessee such as various vernal grasses, carices, Scirpus lineatus, Eleocharis compressa, E. tenuis, Juncus filipendulus and other rushes, Nothoscordium, Hypoxis, Schoenolirion, Delphinium virescens, Arenaria, various Leavenworthia, Lesquerella, Sedum pulchellum, Petalostemon gattingeri, Psoralea subacaulis, Opuntia, Oenothera triloba, Viola, Amsonia, Scutellaria parvula, Verbena canadensis, Houstonia, Hedyotis nigricans, and a variety of composites. Usually it is most abundant in the open areas along intermittent streams or at edges of moister inwash depressions.

The forest type is a Juniperus disclimax, precursor to a mixed hardwood assemblage involving oak (Q. shumardii, Q. muhlenbergii, Q. imbricaria, Q. alba, Q. stellata), hickory (Carya ovata, C. caroliniana-septentrionalis, C. cordiformis) elm (U. americana, U. serotina, U. alata, U. rubra), hackberry, ash (F. quadrangulata, F. americana), Sugar Maple, Persimmon, etc. under which and invading openings are Rhus aromatica, Rhamnus caroliniana, Sassafras, "Svida" dogwoods, Symphoricarpos, Rubus and various vines in Lonicera, Smilax, Rhus, Berchemia, etc. This woody stage succeeds on the limestones as soil develops there, ultimately shading out the herbs of open glades. It was kept in check naturally through fire and erosive forces. The greatest risks to this sort of habitat come from urban and industrial expansion, conversion of open areas to pasture, particularly if some tough perennial pasture grasses such as fescue, bluegrass, or orchard grass are promoted.

#### References:

- McVaugh, Rogers. 1936. Studies in the taxonomy and distribution of the eastern North American species of Lobelia. Rhodora 38: 241-263, 276-298, 305-329, 346-362.
- \_\_\_\_\_. 1942. Lobelia in North Am. Fl. 32A. New York.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1291-1295.

SPECIES: Lobelia gattingeri A.Gray

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:

Lobelia gattingeri A.Gray





ASTERACEAE

Paper 261  
Text & map by:  
Robert Kral

Aster avitus Alexander

Status: Endangered

Technical Description:

Perennial, strongly clonalizing Aster, perennating by leafy lateral offshoots from a shallow, sometimes elongate and forking rhizome, the rhizomes mostly 3-8 mm thick, terete, ribbed, often partly covered by fibrous remains of old petiole bases.

Stems: erect from a decumbent base, mostly 3-5 (-8) dm tall, usually 1 from each leafy offshoot of the previous season, rather slender but stiffish, terete, smooth proximally, puberulent from at least mid-stem into inflorescence, low-ribbed, pale green or with maroon tints in the inflorescence, the nodes numerous and usually leafy.

Leaves: Alternate. Rosette (offshoot) leaves and lower cauline leaves largest, 1.5-2.5 dm long, the blades 1/2 or more the total length, linear, elliptic-linear, linear-oblongate or linear-lanceolate, graminiform, rarely over 1.5 cm broad, acute and apiculate, marginally distantly spinulose-serrulate, the base attenuate to the clasping-based petiole, the surfaces smooth, a rich green, with only the midrib strong or sometimes obscurely triplinerved, the rest of the surface very finely areolate; cauline leaves grading smaller upward on stem, becoming narrower, shorter, more sessile, becoming lance-linear, scabrid-margined, inflorescence bracts.

Inflorescence: Heads rather few (3) to numerous (15 or more) in a simple cyme or a small compound of cymes, the branches densely puberulent, slender, arching-ascending in candelabra fashion, the secondary branches either terminating in 1-2-3 slender peduncles or rebranching from bract axils, in any event the peduncles usually longer than the heads are high; flowering heads broadly campanulate or turbinate, from base to pappus tip 1.2 - 1.5 cm high, the bracts strongly imbricated in several series, the lowermost grading into the short uppermost peduncular bracts, all green-tipped with firm (chartaceous) bases, the innermost longest, palest, thinnest, the median ones oblong, mostly 5-6 mm long, the green tips dilated, often somewhat squarrose, acute and apiculate, the margins ciliate, the surfaces otherwise smooth, the mid-and-lower part of the bract body straw-colored and very firm; receptacular surface nearly flat, chaffless.

Flowers: Ray florets usually not more than 15, often few, female but usually non-functional, the ligules pale to deep violet (rarely pinkish), spreading, above the tube 8-10 mm long, lance-linear; disc florets numerous, the corollas pale lavender, smooth, ca. 5 mm long, the slender tube dilating into a narrowly funnelform throat, the 5 spreading or ascending, triangular lobes ca. 1 mm long, the anther tube well exsert at anthesis, the 2 style branches with appendages linear-acuminate, externally minutely scabrid.

Fruit: Akenes ca. 5 mm long, columnar or slightly fusiform, sometimes slightly compressed parallel to phyllaries, mostly 10-12-ribbed, the ribs broader than the shallow intervals, the surface dull brown,

smooth or sparsely strigillose (these hairs not usually persisting), the pappus uniform, sordid, of numerous, capillary, antrorsely barbellate, bristles 1.0-1.5 mm long.

#### Distribution and Flowering Season:

Shallow sandy soils in or around granitic outcrops, Piedmont, South Carolina and Georgia; flowering from September to frost.

#### Special Identifying Features:

A. avitus is a perplexing taxon, perhaps not truly distinguishable on the one hand from extremes of A. surculosus (which has similar leaves and rootstocks, but usually more heads, a double pappus, hairier fruit) and on the other hand tending to the graminiform-leaved A. paludosus (which has a coarser pappus, often more heads/inflorescence and more rays florets). Consistent differences are simply not available, although extremes of A. avitus stand out very nicely from average conditions for either of the others. The entire complex requires taxonomic clarification.

#### Habitat and Management Implication:

The type locality for A. avitus is Stone Mountain, but that population has been destroyed. My comments are confined therefore to what I have found in the few remaining known localities. This aster is locally abundant in granite glades, is usually rooted in shallow soils of moister depressions in the granitic openings or along the edges of such glades in light shade. The substrate is a highly humified, acidic sand, the humus often high in peat from sphagnum or other mosses. Associated species in the Georgia areas are typical of what one normally finds around the shallow pools, streams or seeps that dot or traverse the rock, some of the more common being Andropogon, Sporobolus, Aristida, Panicum, Cyperus, Scirpus cyperinus, Rhynchospora (mostly R. capitellata, R. globularis), Commelina erecta, Crotonopsis, Senecio tomentosus (rosettes), Hypericum gentianoides, Oenothera fruticosa subglobosa, Rhexia mariana, Agalinis tenuifolia, Liatris microcephala, Solidago erecta, S. nemoralis, Viguiera. The aster is where the substrate is usually moistened by seepwater and remains moist through much of the growing season, as is evident from its frequent association with various Sphagnum. Overstory edging or over the aster is a yellow pine-oak-hickory type, the commonest pines being Virginia, Shortleaf, and Loblolly, the hickories mostly Pignut, Red, White and Sand, the oaks mainly Black, White, Post, Scarlet, Chestnut, Blackjack, and Red. The understory is dominated by Vaccinium arborescens, Rhus, Cornus florida, Cercis, Amelanchier, Sassafras, Chionanthus, with an abundance beneath these of lowbush blueberry, Smilax spp., Poison Oak and Poison Ivy. Japanese Honeysuckle is a common invader, and Bracken Fern is common.

This aster is losing habitat because of granite quarrying, various detrimental development either for recreational-promotional (which is what destroyed the Stone Mountain locality) or residential (which is destroying the one remaining publicized locality in Georgia!). Logging of the woodlands surrounding or on the granites, if unaccomp-

anied by excessive disturbance of the shallow soils, might actually tend to increase this aster, as would fire management, in that fire has been the historical factor in reducing woody plant competition.

References:

Cronquist, Arthur. 1980. Vascular flora of the southeastern United States, Vol. I. Asteraceae: pp. 137-162.

Small, J.K. 1933. Manual of the southeastern flora, pp. 1364-1394.



SPECIES: Aster avitus Alexander

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy								
Damage		NA	NA	NA			NA	X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Present Known Distribution of:  
Aster avitus Alexander



ASTERACEAE

Aster pinifolius E. J. Alexander. Pale-violet aster

Technical Description

Perennial, the plants mostly 6-10 dm tall, forming clones by inter-connecting, slender, horizontal rhizomes and slender, pale, whip-like stolons. Stems.--Slender, wand-like, erect, sparingly branched or simple, mostly smooth, reddish brown basally, upwardly becoming greenish, with low wing-angles and shallow pilosulous grooves.

Leaves.-- Alternate, the lowest gone by flowering time, the largest lowest, mostly linear or elliptic-linear, or narrowly spatulate, mostly 2-3 cm long, acute and with short, fleshy mucros, the margins entire or sparingly low-ascending-toothed, the base sessile.

Inflorescence.--Heads few to many, usually terminating subulate-leafy, ascending laterals (the lowest sometimes with a few elongate, subulate-leafy branches), turbinate, in bloom about 6 mm high, 6 mm across phyllary tips, with uppermost bracts short-linear or subulate and grading into the several, loosely imbricate phyllaries. Phyllaries mostly erect, linear, the inner longest, about 5 mm long with firm, pale, short-excurved bases, acute and short-subulate (often purplish) tips, the margins thin (scarious), sparingly ciliate, the surfaces smooth, the backs with a single impressed mid-nerve, this area with a green median zone and bordered by the pale broad margin.

Flowers.--Ray florets 25-30, the ligules spreading, blue-violet, narrowly linear, about 5 mm long. Disc florets with corollas purplish or rose with triangular lobes about 0.6 mm long.

Fruit.--Akenes short-cylindric, ribbed, pale brown, about 1.5 mm long, short-hairy; pappus yellowish-white, capillary, with fine, upward-pointed barbel.

Distribution and Flowering Season

Wet, open, calcareous places in pine barrens or sandy peaty shores of lime-sink ponds and lakes, southern peninsular Florida, northwestern Florida and southeastern Alabama. Flowering in October, November.

Special Identifying Features.

The distinctness of this aster as a species is doubted by Dr. Cronquist (personal communication) who treats it as a part of the widespread Aster dumosus.

Habitats and Mangement Implication

My own experience with it is in the karst country of southeastern Alabama, and from specimens so identified from similar country in northwestern Florida where it is locally abundant on the shores of limesink ponds and lakes set in the rolling longleaf pine-turkey oak hills. Usually



these same have their intermittent, fluctuating shores bordered by grass-sedge, interspersed with various tall-shrubby Hypericum species. It is in this zone that the Aster grows, often with its bases submersed in shallow water and its roots in wet or at least moist, sandy peat. Upward from this zone is another, usually dryish, zone of Quercus virginiana which is interspersed with longleaf pine or grading into same.

The pine of these areas has been managed variously, the oaks usually left alone. The only problem with impaction of the aster habitat would be any logging combined with draining of the adjacent wetlands where the aster grows or a plowing or bulldozing of this same area. Drainage would of course eliminate this species of high hydroperiod soils. Pasturage of the area destroys plants through trampling.

#### Suggested Reading

Small, J. K. 1933. Manual of the southeastern flora, pp.1364-1394.

Revised March 1980

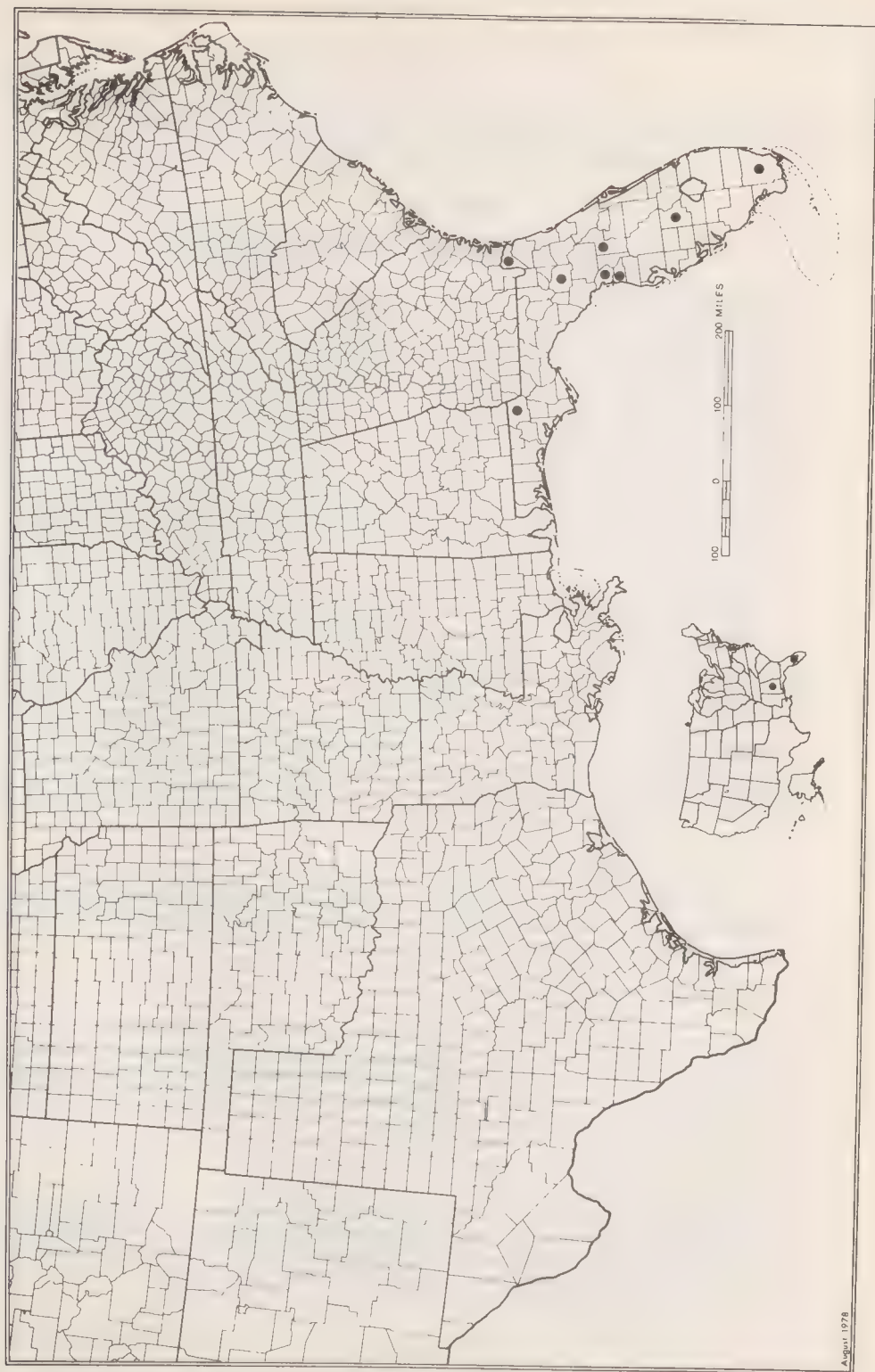
SPECIES: #117 Aster pinifolius E. J. Alexander; Pale-violet aster

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		NA					X	X
Damage								
No lasting effect	NA							
Beneficial if done properly								

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980



MAP 117. *ASTER PINIFOLIUS*



ASTERACEAE

Aster plumosus Small; plumose aster; Aster

Technical Description

Perennial herb, from a round, knotty caudex.

Stems.--The stems wand-like, to a meter or more long, ascending, arching or even sprawling on other vegetation; epidermis of lower stem grayish, with shallow, vertical, pale brown cracks, the upper stem reddish-brown or tan, puberulent with pale spreading hairs.

Leaves.--Lower leaves absent by flowering time, those of mid and upper stem numerous, alternate, sessile, rigid, the largest lowest, mostly elliptic-oblong or lance-oblong, about 1-2 cm long, erect, spinulose-tipped, the margin scabro-ciliate, the surfaces villous-puberulent with incurved hairs. Stem leaves gradually smaller upward on the stem, grading into the involucre bracts.

Inflorescence.--Heads numerous, close-set or scattered along the upper part of the stem on short, ascending, pilose-puberulent lateral branches or solitary on short and short-bracted laterals (thus the whole inflorescence rather narrow). Involucres broadly turbinate, about 1 cm. across, the numerous bracts in several, loosely appressed series; involucre bracts linear, acuminate, pale green with purplish tips, these usually somewhat spreading, the surfaces covered with longish, pale, soft hairs.

Flowers.--Ray corollas about 10-12, the blades lineal, spreading, showy, a deep blue-violet, the ray florets about 1.5 cm long. Disc flowers yellowish.

Fruit.--Akenes oblong, about 2 mm long, ribbed lengthwise, densely silky-hairy with erect hairs; pappus about 5 mm long, capillary, yellowish-white.

Distribution and Flowering Season

This aster is found in deep sands of longleaf pine-deciduous scrublands in northwestern Florida, particularly above the Apalachicola River and associated drainages; flowering September through November.

Special Identifying Features

Taxonomically it most closely resembles the common upland aster, A. concolor L. which is like it in habit, leaf, ray flowers and akene, but which has somewhat broader involucre bracts that tend to be more tightly imbricated and having shorter hairs. In fact, the status of this as a species distinct from A. concolor could be questioned.

Habitats and Management Implication

A. plumosus is most often found, as mentioned above, in longleaf pine-deciduous scrub oak woods, and invariably on deep, dryish to moist sands. Its maintenance and increase is related to periodic burning and therefore fire protection, encouraging increase of overstory, would tend to reduce its

numbers. It will occupy areas that have been clearcut of pine and subsequent scarified and will persist in such areas, growing between the planted or seedling pines, until such time as the crowns close.

#### References

Small, J. K. 1924. Plant novelties from Florida. Bull. Torr. Bot. Club.  
51: 379-393

\_\_\_\_\_. 1933. Manual of the southeastern flora, p. 1384.

SPECIES: #103 Aster plumosus Small, Aster

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								?
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Aster plumosus Small



ASTERACEAE

Aster spinulosus Chapm. pine-woods aster; Aster  
Heleastrum spinulosum Greene

Technical Description

Stiffish perennial herb, mostly 6-8 cm tall, from a short stout caudex cloaked in persistent chaffy-fibrous old leaf bases. Rhizomes, slender, pale, and scaly.

Stems.--Flowering stems 1-few, mostly erect, terete but also ribbed, toward the base greenish and pilose (spreading hairy), upwardly becoming reddish-tinted and smooth.

Leaves.--Linear, numerous and crowded toward the base, there longest, somewhat spreading, up to 2 dm long, smooth save for distantly spinulose margins toward the base, toward the apex entire or somewhat scabrid; leaves gradually diminishing in size upward on the stem, becoming erect, lance-linear with short-spiny tips, and grading into progressively shorter bracts.

Inflorescence.--Heads numerous, arranged in spike-like racemes, each short peduncle subtended by a spreading, lance-linear stiff bract longer than the head. Peduncles rarely as long as 2 mm, supporting 1-2 lance-linear spreading bracts, these grading into the phyllaries. Heads broadly campanulate, about 1 cm from base to pappus tips. Phyllaries (bracts) numerous in several loosely imbricated series, rigid, lanceolate or narrowly triangular, thickish, green with narrow, thinnish maroon, spinulose-serrate or erose borders, the tips narrowed to spiniform short prickles.

Flowers.--Ray florets numerous, the ligules linear-oblong, ca. 1 cm long, nearly white to pale lilac or pale blue, the heads in full bloom about 2 cm. across. Disc florets numerous, the corollas narrowly tubular, yellow, the 5 short-triangular lobes erect.

Fruit.--Akenes linear-columnar, about 2 mm long, pale gray-brown, hairy; pappus 6-7 mm long, of numerous, yellowish-white, rigid, upwardly barbellate, bristles.

Distribution and Flowering Season

Savannas in pinelands, northwestern Florida, primarily in drainages from the Apalachicola River. Flowering from May into July.

Special Identifying Features

This species most closely resembles A. paludosus, a widespread aster of the southeast, but has smaller heads with paler flowers, longer and narrower basal leaves, all leaves sharper pointed and with margins more entire.

Habitats and Management Implications

This plant, said by Small to be in wet pinelands, actually is in more moist than wet situations. Its substrates are acid sandy peats, and it is particularly abundant where fire maintains savanna conditions in what would ordinarily be be longleaf pine-gallberry type. Typically it is found associated with grasses

such as Aristida, Andropogon, Ctenium, sedges such as Rhynchospora globulosus, R. grayii, Xyris caroliniana, Lachnocaulon, Rhexia alifanus, and a variety of other composites indicative of a constantly moist but definitely not wet substrate. It is a plant of full sun or very light shade, thus pines usually only dot its landscape. The shrub understory is usually Ilex glabra, Myrica, Gaylussacia, Lyonia.--Prescribed burning favors such a species by reducing woody competition, as would cutting the pine overstory and understory removal. Most methods of site preparation that involve exposure of the mineral earth through bulldozing, plowing, raking or plowing would eliminate this species, the least damaging method probably being bedding. A successful planting of pine would eliminate this Aster through ultimate crown closure of the young pines. Much of the former area of this species, which includes about four counties, has been lost either through pine plantations, improved pastures, or development of row crop agriculture.

#### References

Small, J. K. 1933. Manual of the Southeastern Flora, p. 1392.



SPECIES: #3 Aster spinulosus Chapm. Aster

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Aster spinulosus Chapman



ASTERACEAE

Balduina atropurpurea Harper. Purple balduina

Endorima atropurpurea (Harper) Small

Technical Description

Perennial.

Stems.--The stem erect, usually simple or sparingly branched, purplish, slightly hairy, roundish in cross section but with several low, longitudinal ridges, from a short, thick, erect rootstock with fleshy roots.

Leaves.--Alternate, narrowly spatulate, rather fleshy, numerous and evenly disposed along the stem, ascending, the largest at and toward the base, up to 12 cm long, becoming gradually shorter toward the inflorescence, short-acute, the margin entire, the base long-attenuate, sessile or short-petiolate, the surface yellowish-green, finely pitted.

Inflorescence.--Heads 1-few, usually on long, but stiffish peduncles, when fully open to 2 cm high and 5-6 cm broad.

Flowers.--Ray flowers a rich yellow, fully 3 cm long, spreading, three-to-five-toothed at the tips. Disc florets very numerous on the elevated receptacle, the corollas a deep purplish or deep reddish-brown.

Fruit.--Akenes narrowly obtriangular, finely hairy, capped by a ring of narrow, pale, thin scales.

Distribution and Flowering Season

This showy species is found only in the Coastal Plain of northeastern Florida and in southern Georgia and blooms mostly in August and September.

Special Identifying Features

Its nearest relative, B. uniflora, is a very similar plant with shorter leaves and a yellow disc.

Habitats and Management Implication

B. atropurpurea grows on moist, sandy, peaty clearings among slash pine, or Tongleaf pine or a mixture of these, with an understory of palmetto, ericaceous shrubs such as blueberry, huckleberry, staggerbush, fetterbush, dwarf kalmia, shrub hypericums, and saw palmetto. It is sometimes associated with pitcher plants, lycopods, xyrids, eriocaulaceous species. Thus, it is a part of the high-hydroperiod, acidic soil complex of vegetation, and like most of these, increases with a decrease of understory shrub and overstory through fire. Selective logging or clear cutting would favor it. Mechanical removal of understory shrubby vegetation would favor its increase as would mechanical disturbance of the soil so long as the organic content were now lowered. However, drainage, so as to lower both the water content and organic content of the peaty soils it occurs in, would eliminate the species.



The species is related to the common bitterweed, Helenium amarum, and, like it, is not usually grazed unless nothing else is available. Thus, its main danger would be from drainage, a full development of coniferous overstory, or land development.

#### Suggested Reading

Harper, R. 1901. On a collection of plants made in Georgia in summer of 1900. Bull. Torr. Bot. Club 28:454-484.

Harper, R. 1904. Explorations in the Coastal Plain of Georgia during the season of 1902. Bull. Torr. Bot. Club 31:9-27.

Harper, R. 1905. Phytogeographical explorations in the Coastal Plain of Georgia in 1903. Bull. Torr. Bot. Club 32:141-171.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1454-1455.

Revised March 1980

SPECIES: #102 Balduina atropurpurea Harper. purple balduina

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X		X				
Damage			X					
No lasting effect								X
Beneficial if done properly	X				X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980

Balduina atropurpurea R. Harper





ASTERACEAE

Brickellia cordifolia Ell. Flyr's brickell-bush; N.C.N.  
Coleosanthus cordifolius (Ell.) Kuntze

Technical Description

Erect perennial herb from an erect, cylindrically thickened rhizome (caudex).  
Stems.--Solitary or few, erect or ascending, unbranched, mostly 1.0-1.5 meters tall, terete, longitudinally many-low-ribbed, puberulent.

Leaves.--Confined to stem, the lowest gone by flowering time, the largest at midstem opposite, spreading on slender long petioles, mostly triangular, mostly 6-10 cm long, acuminate, the margins crenate-dentate, the bases broadly rounded or truncate, short-attenuate to the petiole; upper surface of blade dark green, smoothish; lower surface puberulent and gland-dotted.

Inflorescence.--Rather few-headed, either a single cyme or a cluster of a few cymes, the puberulent peduncles stiffly erect or ascending, the bracts few, mostly lanceolate. Heads exclusively discoid, broadly top-shaped, 1.5-2.0 cm broad, the bracts in several, loosely overlapping series, the outer few shortest, narrowly or broadly triangular, the inner larger ones larger ones narrowly oblong, 6-8 mm long, strongly parallel-ribbed, obtuse to acuminate, the margins and backs with small wooly hairs. Receptacle of head slightly elevated.

Flowers.--Disc florets very many, tubular, the corolla base whitish, toward the tip purplish, the corolla lobes low-triangular, slightly spreading.

Fruit.--Akenes cylindrical or slightly compressed, about 5 mm long, strongly ribbed, brownish, puberulent; pappus of many, purplish-brown, upwardly-barbellate bristles, these projecting above the tips of the bracts.

Distribution and Flowering Season

Rich sandy loamy soil of high hammocks in the Coastal Plain, Georgia south to peninsular Florida and west into southern Alabama. Flowering from August to October.

Habitats and Management Implication

This species is to be looked for on well-drained fine sandy loams, usually in mature forest of upland hammocks. The overstory is usually comprised of a mixture of pines such as P. taeda, P. glabra with hardwoods such as live-oak, willow-oak (complex), beech, magnolia (M. grandiflora), etc. Frequent in the understory would be such shrubs as Myrica cerifera, Vaccinium spp., Rhododendron (particularly canescens), Osmanthus, Kalmia, Sebastiania, Arundinaria. In foliage and in general appearance of the plant, it mostly closely resembles the "Snake-root" type of Eupatorium, and is often in association with two of these species.

Selective logging of the pine-mixed hardwood overstory would probably not create an adverse situation for this species of open woodlands. Heavy logging

on the other hand would tend to produce a scrub or shrub response that might provide a problem in competition. Clear cutting and mechanical site preparation for row crops of pine would eliminate this species by changing the habitat. Pine plantations are devoid of this plant and most other high mixed-hammock species of forbs.

#### References

Small, J. K. 1933. Manual of the Southeastern Flora: 1328.

SPECIES: #104 Brickellia cordifolia Ell. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage No Lasting Effect	(NA) X					X		X
Beneficial if Done Properly					X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Brickellia cordifolia Ell.



ASTERACEAE

Cacalia diversifolia T. & G. variable-leaved indian-  
plantain; Indian-Plantain  
Mesadenia diversifolia (T. & G.) Greene

Technical Description

Smooth perennial herbs with thickened roots from a short-thickened erect caudex.

Stems.--Usually single, simple (unbranched) below the inflorescence, stiffly erect, coarsely angled, purplish-tinted, bolting from an overwintering rosette of long-petiolate, ovate, coarsely toothed or shallowly lobed leaves.

Leaves.--Several toward the stem base, scattered upward alternate, the lowest largest, long-petiolate, the upper short petiolate or nearly sessile, the largest blades 10-15 cm long, ovate, acute, the margins from sinuate and distantly dentate to shallowly triangularly lobed, the bases abruptly attenuated to the winged petiole. Rosette leaves similar.

Inflorescence.--A many-headed flattish-topped or concave cyme, the branches of which arch upward from the upper stem nodes. Heads narrowly bell-shaped or cylindric, the bracts in 1 series, linear with a winged midrib, yellowish or greenish-white.

Flowers.--Corollas all discoid, the corolla lobes linear, pale or bright lavender.

Fruits.--Akenes fusiform, 4-5 mm long, dark brown, inconspicuously ribbed and somewhat flattened, the pappus of fine white bristles about as long as the akene body.

Distribution and Flowering Season

Banks of streams through low hardwood hammocks, from southeastern Alabama and southwestern Georgia southward through west Florida into northwestern peninsular Florida. Flowering from late May through June. August.

Habitats and Management Implication

This Cacalia is always on sandy-silt or muck in river bottom woodlands. It particularly abounds where there are natural or artificial clearings in such woods, there forming almost pure stands, its large cymes of whitish heads making a conspicuous sight. Common associated species of herbs are Juncus spp., Sagittaria spp., Scirpus cyperinus, S. divaricatus, Peltandra virginica. In the overstory are Betula nigra, Nyssa aquatica, N. biflora, Fraxinus caroliniana, various oaks, particularly Q. lyrata, Q. michauxii, various willow oaks, Carya aquatica, Liquidambar, and occasional Taxodium. It is usually in bottoms that overlie massive limestone.

Selective logging of the bottoms frequented by this species would likely favor its increase through creation of small openings that would admit the partial light it needs. Heavy logging of the same areas would likely increase other herbaceous or shrubby vegetation to competitive disadvantage. Also, while this species is in bottoms, it is not favored in situations where water

covers the ground through the entire season. Heavy logging of such bottoms often results in a rising of the water table and subsequent flooding out of some bottomland species such as this.

#### References

Small, J. K. 1933. Manual of the Southeastern Flora, pp. 1475-1476.

Kral, R. and R. K. Godfrey. 1958. Synopsis of the Florida species of Cacalia (Compositae). Quart. Journ. Fla. Acad. Sci. 21 (3): 193-206.



SPECIES: #105 Cacalia diversifolia T. & G. Indian-Plantain

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X		X		
Damage								
No Lasting Effect	NA							
Beneficial if Done Properly					X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

*Cacalia diversifolia* T. & G.



ASTERACEAE

Cacalia rugelia (Shuttlew, ex Chapm.) Barkley & Cronq. Rugel's indian-plantain  
Senecio rugelia A. Gray

Technical Description

Perennial, soft and brittle-foliaged herb, essentially rosulate, perennating by stout, ascending, rhizomatous offshoots.

Stems.-- Rhizomes stout, variously elongate, shallowly set in the duff, ascending, toward apex densely cloaked in the overlapping old scale leaves, these densely spirally imbricate, grading abruptly into rosette leaves at rhizomal apex.

Leaves.-- Principally and largest in the rosette, very much in size and outline reminiscent of Plantago major, P. rugellii or P. cordata, namely spreading or erect, mostly 10-20 cm long, slightly over half of the flat but thickish-succulent petiole, the blades broadly ovate, soft, flat, acute or short-acuminate, the margins distantly but regularly denticulate, the denticles callus-tipped, the base rounded, truncate, even slightly cordate, in any event then abruptly decurrent on the petiole to its base, the upper surface deep green, sparsely appressed-floccose, much paler and somewhat more floccose on lower side and petiole.

Inflorescence.-- Scapes rigidly erect, usually 1, rarely 2/plant, mostly 20-40 cm tall, terete, longitudinally low-ribbed, glandular-pilous, dull green, with several small, distant, alternate, spreading bracteal leaves, these sessile or short-petiolate (the lower ones sometimes approaching rosette leaves in shape, but much smaller), narrowly ovate to broadly lanceolate or elliptical, with pubescence as in rosette leaves and grading into even smaller peduncular bracts. Heads mostly 3-6, in a short, determinate, bracteate raceme, terminating long, erect peduncles usually much longer than the heads so that all approach one another to form an elliptical or oval pattern, at anthesis broadly campanulate, from base of receptacle to tip of florets ca. 2 cm high, and about as wide across the pappus tips, the receptacle naked, somewhat concave, the phyllaries thin, greenish, erect, in essentially 2 series, fused toward their bases, ca. 1 cm long, lance-linear, with the inner series somewhat broader, acute to acuminate, broadly scarious-margined apically, inconspicuously parallel-nerved, smooth or scattered-puberulent on the backs; florets numerous, all discoid, perfect, the corolla cream, ca. 8-9 mm high, its base narrowly tubular, expanding to a broadly tubular upper half, the 5 triangular lobes spreading at a level about even with the tips of the numerous capillary, white pappus bristles, the anther cylinder narrow, purplish, definitely exserted at an angle beyond the corolla orifice, the 2 somewhat flattened style branches apically subcapitate, truncated, bristly-tipped.

Fruit.-- Akenes columnar, smooth, ca. 4-6 mm long, 0.8 mm wide, with many, low longitudinal ribs, pale brown; pappus as described above.

Distribution and Flowering Time

Rich, moist coniferous woods at high elevations in the Blue Ridge Mountains of Tennessee and North Carolina; flowering late June to September.



### Special Identifying Features

C. rugelia differs from the other southeastern Cacalia in its essentially rosulate habit, in being pubescent (the other Cacalia are smooth), in its larger, yet fewer, more floriferous, heads. As the synonymy indicates, it was once placed in Senecio, removed from it partly because of its atypical chromosome number, but certainly does not bear much resemblance to any southeastern Senecio either in leaf or in flower color.

### Habitat and Management Implications

C. rugelia may locally form populations of thousands of individuals amongst granite boulders and on ledges, rooted in moist, highly acidic duff under spruce or fir toward or on summit elevations of some of the higher ridges in the Blue Ridge (Haywood, Swain, Macon counties in N.C., Sevier Co. in Tennessee). It is a shade plant, preferring a continuously cool, moist substratum, and would be damaged by any removal of the essentially coniferous overstory. Much of its territory lies within National Park or National Forest, but its choice of summit forest makes it susceptible to trampling by backpackers who travel the ridge trails. Irresponsible private or public development for recreational-vacational purposes of the high ridge country also poses a threat to this species. The plant is certainly rare enough in occurrence, and narrow enough in range to be monitored carefully in future.

### References

- Barkley, T.M. and A. Cronquist. 1974. Cacalia rugelia, a new combination for a North American Senecionoid. Rhodora 76: 48-50.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1475-1480. Chapel Hill, N.C.

SPECIES Cacalia rugelia (Shuttlw. ex Chapm.) Barkley & Cronq.  
Rugel's indian-plantain

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X					X		
Damage		NA	NA	NA	X		NA	
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Cacalia rugelia (Shuttlw. ex Chapm.)  
Barkley & Cronquist





ASTERACEAE

Coreopsis intermedia Sherff. golden-wave tickseed

Technical Description

Thick-rooted perennial herb increasing by lateral shoot buds from a stout caudex.

Stems.-- 1-several, erect or ascending, mostly 6-10 (-15) dm long, stiffish and brittle, toward base nearly terete, pale brown or purplish-brown, sparsely puberulent or hirsutulous, upwardly becoming greenish, the internodes strongly ribbed or sulcate, simple or sparingly branched below the inflorescence.

Leaves.-- Opposite; lowest leaves usually withered by flowering time, close-set, simple (or trilobed with terminal lobe largest), as long or longer, slender, but clasping-based; leaves higher on stem becoming sessile or short-petiolate, all simple and unlobed, the largest at about midstem, spreading, rather distant, firm (slightly fleshy), elliptic, oblong, lanceolate or oblanceolate, to 7 cm long, the tips obtuse or rounded, the margin with a somewhat paler, thickened, puberulent, entire edge, the base short-attenuate, broadly cuneate or rounded-clasping, the upper surface yellow-green, puberulent to nearly smooth, the lower surface paler, puberulent to smooth; leaf size diminishing gradually to the inflorescence base, thence rather abruptly smaller, the bracts distant or absent in the inflorescence.

Inflorescence.-- Heads rather few, solitary at tips of upwardly arching to erect, smooth to slightly puberulent, strongly ribbed peduncles, these mostly 6-20 cm long and usually bractless or with bracts only at very base. Heads (involucres) at anthesis broadly campanulate, mostly about 1.5-2.0 cm wide across the phyllaries, ca. 1.5 cm high (from base to tips of inner phyllaries), the phyllaries essentially in 2 series with the outermost distinct, lanceolate, 8-10 mm long, greenish and multinerved, with narrow but firm, cartilaginous and bristly tips, marginally pale-banded, ciliate, the backs smooth; inner phyllaries broadly lanceolate or narrowly ovate, erect, mostly 12-15 mm long, orange-yellow, the tips narrowly rounded, minutely ciliate, the margins entire, thin, the surfaces smooth; chaff of elevated receptacle mostly 6-8 mm long, firm-papery, linear-lanceolate, whitish, with subulate, brownish tips, the backs slightly convex, with 1-2 brown, medial bands.

Flowers.-- Ray florets 8-10, the corollas spreading, clear yellow, the tube ca. 2 mm long, the blade broadly obovate-cuneate, 2.5-3.0 cm long, the broad apex irregularly and rather coarsely toothed; ovary apparently infertile, oblong-linear, ca. 4 mm long, flattened, bearing at apex a pair of low, lacerate pappus scales; disc florets numerous, fertile, the tubular-narrowly campanulate corollas ca. 5 mm long, the tube and throat yellowish-white, with 5 reddish lines, and 5 short-triangular, slightly spreading, deeper yellow, red-margined lobes. Style branches short-spreading, apically minutely glandular-bristly with short, narrowly conic appendages. Pappus consisting of 2 (sometimes more) small, erect, pale, triangular, 3-winged, acutish scales.

Fruit.-- Akenes mostly broadly ovoid to nearly round, mostly 2.5 mm long and nearly as broad or broader, inwardly curvate, deep reddish-brown, the

convex backs strongly tuberculate, the inner face forming a membranous entire-margined cup around the obovate seed cavity whose surface is strongly tuberculate and which bears marginally a strong, broad, purplish-brown, thin, entire, erose or pectinately fringed wing-border.

#### Distribution and Flowering Season

Sands or sandy loams of open woods, sandy fields and roadsides, northeastern Louisiana and northeastern Texas. Flowering mostly in May and June.

#### Special Identifying Features

C. intermedia is closest taxonomically to C. pubescens Ell., a widespread species mostly of the interior provinces in the southeastern U.S. and in the Ozarks. However, the range of the former is nested within, does not overlap, that of the latter (so far as present records indicate). It is to be distinguished from C. pubescens by its fleshier, firmer leaves, which tend toward the plant base to be entire, less often pinnate, and by its longer range of peduncle lengths. Hybrids between it and C. pubescens have been synthesised by Dr. E. Smith, as have hybrids between it and C. grandiflora (with highest pollen stainability) and C. nuecencis (Smith, 1976).

#### Habitat and Management Implications

C. intermedia is most abundant on deep sand soils, in open oak-hickory or oak-hickory-pine woods or on sandy clearings in such woods. The soil, if not a nearly pure sand, is but slightly humified, and generally rather dry. The oaks are mainly Q. stellata, Q. margaretta, Q. marilandica, Q. falcata, Q. incana, the hickories Carya texana, C. tomentosa, the pines P. echinata, P. taeda, the understory mostly of Cornus florida, Vaccinium arboreum, Sassafras, Tow bush blueberry, etc. Sandhills herbaceous species such as Froelichia, Poronychia, Berlandiera, Tetragonathea, Stillingia, Cenchrus, Cnidoscolus, Penstemon (murrayanus) are common. The hardwood forest is of relatively low quality, being best suited for growth of pine, which is plantation managed through much of the area. Clear cutting, even accompanied by considerable soil disturbance, would favor increase of this species through creating more light. The region has a history of fire, this probably the disturbance factor which has over time created openings for C. intermedia to occupy.

#### References

- Sherff, E.E. 1926. New or otherwise noteworthy Compositae III. Bot. Gaz. 88: 285-309.
- Smith, E.B. 1976. A biosystematic survey of Coreopsis in eastern United States and Canada. Sida (3): 123-215.

SPECIES Coreopsis intermedia Sherff. golden-wave tickseed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage								
No Lasting Effect		X	X	X				
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Coreopsis intermedia Sherff



ASTERACEAE

Coreopsis latifolia Michx. broad-leaved tickseed

Technical Description

Perennial herbs from short, knotty rhizomes.

Stems.-- Erect or ascending, solitary or clumped, the stem bases often decumbent and rooting from lowermost nodes, upwardly abruptly bent, erect or nearly so, to 1.5 meters tall, smooth, green, terete, low-ribbed, the ribs pale green, most prominent distally, the axis usually unbranched below the inflorescence.

Leaves.-- Mostly opposite, ascending or spreading, on petioles 1-3 cm long, the blades thin, mainly broadly lanceolate to ovate, the lowermost absent by flowering time, the largest generally about mid-stem, 10-20 cm long, 5-10 cm broad, acuminate, coarsely serrate or serrate-dentate, the teeth-tips apiculate, the blade bases cuneate to attenuate, usually entire, the upper surface a deep yellow-green, smooth, the lower surface markedly paler, smooth to sparsely soft-puberulent; blades abruptly or gradually diminishing in size into the inflorescence, there mostly lanceolate, lower-toothed, remaining petiolate.

Inflorescence.-- A few-to-many-headed, rather open but narrowish cyme, the primary branches with long, naked bases, arching stiffly upward, the ultimate branches (peduncles) usually villosulous, generally longer than the heads subtended, subtended by or bearing narrowly elliptic or short-linear bracts.

Heads.-- At anthesis ca. 1 cm high, campanulate, the receptacle low-convex, the bracts in 2 series, the outer ones 5, spreading ascending or reflexed, linear-spatulate or oblong-linear, green, blunt-tipped, smooth, mostly 5-10 mm long, the inner series erect, broadly oblong, apically obtuse angled, also ciliate, to 1 cm long, firm-chaffy, enlarging with age, the margin pale, scarious, the surfaces at anthesis yellow-green, smooth, narrowly ribbed longitudinally with reddish resin vesicles; pales (chaff) about the length of the inner cracks, similar in texture and veining, but grading narrower inward on receptacle, the scarious margins sparsely ciliate.

Florets.-- Ray florets 4-5, sterile, the corollas yellow, the tubular base sparsely villous, the ligules spreading, broadly oblong-elliptic, mostly 1.5-2.0 cm long, clear yellow, the parallel veining narrow, orange; disc florets many, dull yellow-green or orangish, the base greenish, ca. 1.5 cm long, expanding to a cylindrical throat ca. 5 mm long, the 5 triangular lobes at anthesis slightly spreading, ca. 1.5 long; anther tube at anthesis long-exsert, dark purple-brown; stigma apices yellow, narrowly conic-subulate.

Fruit.-- Akene oblong-elliptic, dorsiventrally flattened (flattened parallel to the bracts), mostly 7-9 mm long (frequently ranging in length in the same head!), 2-edged and medially ribbed, occasionally with 1-2 additional ribs, dark brown, smooth, the pappus obsolete.

Distribution and Flowering Season

Rich, hardwood forested mountain coves and slopes, Blue Ridge, western North Carolina southward into South Carolina and northeastern Georgia; very local;

flowering from September to frost.

### Special Identifying Features

This species looks more like a Helianthus or Heliopsis at first glance than it does a Coreopsis. In fact, it is invariably associated with species in both these genera, particularly Helianthus decapetalus, H. divaricatus, and Heliopsis helianthoides. Of course, its double and dimorphic bract series with inner bracts not overlapping and its flattened fruit help to distinguish it at close range. Within the opposite-leaved Coreopsis there is nothing else like it, particularly in leaf, in that all the other species have leaf or leaflet blades entire, usually much firmer, certainly smaller. C. latifolia has another peculiar quirk in that usually all of its rays do not develop equally, this giving a "lopsided" aspect to the heads at anthesis.

### Habitat and Management Implications

C. latifolia is a species of rich, moist, deep, well-drained, shaded sandy loams such as are found in the Blue Ridge mountain coves; I have not seen it above altitudes of 4,000 ft. It is invariably in or at the edges of open or dense forest, this mostly hardwoods such as Liriodendron, Aesculus octandra, Tilia, Quercus rubra, Q. alba, Acer saccharum, A. rubrum, Betula lenta, etc., sometimes with White pine, Hemlock. The understory is mostly Cornus florida, Rhododendron, Clethra, Viburnum, Sambucus and the herbaceous associates are those common to rich Southern Appalachian coves, in late summer and fall being mostly various Eupatoria (mainly E. rugosum, E. sessilifolium), Aster, Solidago (particularly S. caesia, S. curtisii, S. arguta) Elephantopus, Helianthus, Verbesina, Heliopsis, many ferns, Cimicifuga, Actaea alba, Campanula americana, Pycnanthemum (particularly P. montanum, P. pycnanthemoides), Monarda, (didyma, fistulosa, clinopodia), Physostegia, Stachys, Agastache, Muhlenbergia, Chasmanthium, Panicum, etc. The site, while rich, is often rocky, the deep soil around or pocketed in a jumble of acidic rock, this from upslope and frequently overlying basic rock. In that C. latifolia is a shade plant or at best an edge plant, it is supposed that such a plant would not succeed or compete well in clearcut areas, though the precise reasons for this are not known. Clear-cutting, attempted in steep areas such as these, would likely have a disastrous effect in admitting too much light and along with it, weedy herbs and woody plants (such as Lonicera, Rubus, Smilax, Pueraria) which would put stress on this species: erosion and drying out of the substrate would also occur. On the other hand, selection or group selection would probably have no lasting effect, were this done with minimum impact to the soil.

### References

- Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 1120-1125. Chapel Hill, N.C.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1446-1450. Chapel Hill, N.C.
- Smith, E.B. 1976. A biosystematic study of Coreopsis in eastern United States and Canada. Sida 6 (3): 123-215.



SPECIES Coreopsis latifolia Michx. Broad-leaved tickseed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	X	X	X	X		X		X
Damage								
No Lasting Effect					X			
Beneficial if Done Properly								

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Coreopsis latifolia Michx.



ASTERACEAE

Coreopsis pulchra F. Boynton in Small

Status: Threatened

Technical Description:

Caespitose, smoothish, perennial sunflower, the few-to-several stems each arising from a fleshy, stout-linear, ascending rhizome to 1 cm thick, the rhizomes often radiating from a parent plant.

Stems: rarely erect, usually decumbent-based or spreading outward from the center of a clump, mostly unbranched below the inflorescence, mostly 3-7 (-10) dm long, terete, with many low ribs, slender but stiffish, pale yellow-green or with red or maroon-tinted ribs, strongly leafy with many short internodes, the shortest at stem base, the nodes sometimes sparingly spicular-hairy, the lowermost leafless by flowering time.

Leaves: opposite, the smallest lowermost, the largest toward mid-stem, nearly sessile, ternately dissected to the very base, the primary segments narrowly linear, flat, again divided toward base or pinnately divided near base, but the ultimate segments mostly long, linear or linear-spathulate, 1-ribbed, yellow-green, apically acute, marginally entire or slightly scabrid distally, the overall effect being one of dense leafiness, the segments because of their length and abundance appearing as verticels of linear leaves.

Inflorescence: Heads few to many in a terminal cyme or occasionally some of the lower peduncles also cymose; peduncles erect or ascending, variously elongated, naked or with a pair or more of short-linear bracts; involucre at anthesis campanulate, from base to tip of chaff 7-10 mm high, very firm, and comprised mostly of 2 series of bracts, each series joined basally into a cup (calculus), with sometimes an additional 1-2 small bractlets at very base; outer phyllaries smallest, green, erect, linear-spatulate or oblong, obtuse, entire or ciliate, 3-4 mm long; inner phyllaries yellowish-orange, the free portions erect, oblong-ovate or triangular, the narrowed apices minutely ciliate, blunt, the margins toward base scarious; surface of receptacle chaffy with pales colored as in inner bracts, mostly narrowly spatulate-linear, to 1 cm long.

Flowers: Ray florets 7-10, sterile (sterile ovary and perianth tube after anthesis expanding, flattening and elongating to form an outer ring of chaff!), the ray corollas spreading above a short, puberulent tube, the ligules elliptic-linear, 2-3 cm long, bright yellow; disc florets very many, in mass a dark purplish-brown, the disc corollas linear-funneliform, 4-5 mm long, the 5 short, triangular lobes erect or slightly spreading, sometimes apically puberulent.

Fruit: Akene body elliptical-oblong, strongly flattened parallel to phyllaries, ca. 5 mm long, smooth, longitudinally low-ribbed, dark gray-brown, but with narrow yellow marginal bands; pappus early deciduous, highly variable in length, of 2, subulate, yellowish awns, one on either side of an apical notch in the akene.

Distribution and Flowering Season:

Sands and sandy loams in and around sandstone outcrops, northeastern Alabama and adjacent northwestern Georgia; flowering from late August through September, intermittently to frost.



### Special Identifying Features:

This species most resembles C. verticillata L. or C. delphinifolia Lam., but the former, which in range extends no nearer than the Blue Ridge province of western North Carolina and the latter, primarily of Coastal Plain Georgia and South Carolina with an outlier in eastern Tennessee, both develop slender, elongate, yellowish rhizomes which are lacking in C. pulchra; both have yellowish, rather than purplish-brown, discs.

### Habitat and Management Implication:

C. pulchra is either in shallow pockets of inwash soil over sandstone or on the shallow sandy soils around the outcrops. This substrate is usually in full sun, subject to great extremes of temperature and moisture. Associated herbs indicate at least seasonal dryness; *Talinum* spp., *Opuntia compressa*, *Crotonopsis*, *Panicum litnophilum*, *P. flexile*, *Deschampsia flexuosa*, *Commelina erecta*, *Agave virginica*, *Polygonum tenue*, *Liatris microcephala*, *Bigelovia nuttallii*, various other upland composites, and many outcrop lichens and bryophytes. Successional forces are toward gradual invasion of the shallow soils and outcrops first by perennial grasses and forbs, later by pine-oak-hickory with an understory of Sourwood, Mountain Laurel, Holly, Fringetree, Dogwood, Blueberry, etc., with the *Coreopsis* and other heliophytes confined to smaller and smaller clearings, finally suppressed. Openings were in nature probably maintained by periodic woods fires together with erosive forces. Danger to the species today comes from real estate development of private lands, particularly those along the streams which are highly scenic because of the ruggedness of the sandstone bluffs and outcrops. Another current danger is from wholesale denudation of some parts of this habitat by coal stripminers. It is fortunate that large stretches of bluffs and outcrops along and above the Little River in northeastern Alabama, and which support large populations of this *Coreopsis*, are a part of the Alabama State Park system.

### References:

- Sherff, E.E. 1936. Revision of the genus Coreopsis. Field M.s Nat. Hist. Bot. Ser. 11: 277-475.
- Small, J.K. 1903. Flora of the southeastern United States, p. 1277.
- \_\_\_\_\_. 1933. Manual of the southeastern flora: 1446-1450.
- Smith, E.B. 1976. A biosystematic survey of Coreopsis in eastern United States and Canada. Side 6 (3): 123-215.

SPECIES: Coreopsis pulchra P. Boynton in Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy								
Damage No Lasting Effect		NA	NA	NA			NA	X
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:  
*Coreopsis pulchra* F. Boynt.





ASTERACEAE

Echinacea laevigata (Boynt. & Beadle) Blake. Cone-flower  
Brauneria laevigata Boynt. & Beadle in Small  
Echinacea purpurea var. laevigata (Boynt. & Beadle) Cronq.

Technical Description

Tall glabrous perennials from stout, erect, simple or branched rhizomes.

Stems.--Up to 1.5 meters tall, rarely (then sparingly) branched, stiffly erect, terete or somewhat angled, below greenish-brown or purplish-tinted, above greenish or purplish.

Leaves.--Rosette leaves or offshoot leaves largest, long-petiolate, with lanceolate or narrowly ovate blades to 15 cm long, apices acute, margins entire or distantly low-toothed, the bases attenuate to petioles nearly as long as or longer than blades, these clasping-based. Lower stem leaves approximate, similar to rosette leaves, those of mid-stem and above increasingly smaller, shorter petioled, more distant, the upper part of the stem forming an elongate, naked peduncle.

Inflorescence.--Heads short-conic, mostly 2.0-2.5 cm broad, usually solitary at peduncle tip, or occasionally stems producing 2-3 additional, erect peduncles. Bracts of involucre several, greenish, the bases imbricated in several series, the acute tips spreading or recurved. Surface of receptacle conic, covered with abundant, erect, smooth, linear, sharp, purple-tipped chaff (pales), each pale keeled, partly enfolding the base of a flower, the whole head looking bristly.

Flowers.--Ray flowers with rays mostly 6-7 cm long, lineal, pale purple, spreading downward. Disc flowers with corollas tubular, purple, about 5 mm long, the teeth mostly erect, short-triangular. Fruit.--Akenes oblong-prismatic, usually 4-angled, gray-brown, about 4-5 mm long, the pappus a low, thin crown of triangular teeth.

Distribution and Flowering Season

Meadows, open woodlands, glades, usually over calcareous parent material, southwestern Virginia (Valley & Ridge, Blue Ridge and Piedmont) southward to northeastern Georgia; reported from northeastern Alabama.

Special Identifying Features

Taxonomically this is closest to the common eastern purple cone-flower E. purpurea, but is by comparison smooth, with longer and narrower ray corollas. The awn of the chaff is usually 1/4 as long as the pale body, while that of E. purpurea is longer, mostly 1/2 as long as the pale body. E. purpurea also tends to be a more robust plant with somewhat larger heads and a less erect rootstock.

### Habitat and Management Implications

This species forms small stands in open, grassy woodlands. My own experience with it has been in low-grade upland hardwoods such as mixed oak-hickory-juniper where it occupies small clearings. Selective removal of the trees would little alter the habitat and in fact would promote the development of glade plants such as this. Burning (not recommended for this sort of forest) would probably not harm these plants in that they are cormophytes. Conversion to grazed woodlot would not favor the species in that it is taken by cattle or sheep, yet gastroenteritis is reported from the ingestion by cattle or sheep of Rudbeckia, a closely related genus. It is possible that the plants are lost from grazed habitat more because of mechanical damage to them by trampling. Woods fires favor the increase of this species.

### References

- McGregor, R. L. 1968. The taxonomy of the genus Echinacea (Compositae). Univ. Kansas Sci. Bull. XLVIII (4): 113-142.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1420-1421. Chapel Hill, N. C.

SPECIES Echinacea laevigata (Boynt. & Beadle) Blake. Cone-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage		NA	NA	NA				X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Echinacea laevigata (Boynt. & Beadle) Blake



ASTERACEAE

Echinacea tennesseensis (Beadle) Small;  
Tennessee purple cone-flower

Brauneria tennesseensis Beadle

Technical Description

Perennial, the several erect shoots arising from a short, thick, branched underground, erect or spreading rhizome.

Stems: Greenish or purplish tinted, roundish in cross section but longitudinally low-ridged, spreading-rough-hairy.

Leaves: Both in a rosette and scattered up the stem, there alternate, rough-hairy: Rosette leaves long-petioled, to 2.5 or 3.0 dm long, the blades mostly linear-elliptic or linear-lanceolate, triple-nerved, these grading into progressively shorter, short-petioled, then sessile, linear stem leaves, these further reduced on, then absent from, the elongated peduncle.

Inflorescence: Heads solitary at tips of shoots on long, stiff, leafless peduncles, fully 7 cm broad in full bloom and 2.5-3.0 cm high.

Involucre with 2-3 series of green, white-ciliate, linear bracts; surface of receptacle elevated, conic, producing with each flower a deep brown or orangish bristly bract (chaff) giving the heads in bloom or fruit a prickly appearance.

Flowers: Rays 8-10, the ray corollas spreading horizontally, linear-oblong, 2.5-3.0 cm long, apically narrowly toothed, a rich bright purple. Disc flowers purplish-tinted, the corolla lobes usually erect, triangular.

Fruit: Akenes short oblong-triangular, angulate, gray-brown, the pappus a thin but firm, irregularly toothed crown atop the akene.

Distribution and Flowering Season

E. tennesseensis appears to be confined to a few localities in the counties of Davidson, Rutherford and Wilson, in the Central Basin of Tennessee. It blooms from late June through July, and intermittently through to October, depending on rainfall.

Habitats and Management Implication

This species is always found on the thin soil over horizontally bedded limestone of Ordovician age, usually in clearings or in open stands of Juniperus virginiana. It is a part of that complex of species known to inhabit what are called "open" limestone glades. It is commonly associated with such species as Petalostemon gattingeri, Astragalus tennesseensis, Satureja glabella, Blephilia ciliata, Asclepias viridiflora, A. virescens, A. tuberosa, Opuntia, Talinum calcaricum, annual and various grasses such as Sporobolus, etc. This sort of soil is wet during the winter and early spring, then becoming

a sticky saturated clay, but during late spring and through summer drying to become almost bricklike in hardness.

The species appears to be part of the perennial forb stage of plant succession in the Central Basin that ultimately prepares the site for Juniperus virginiana, which gives way to a climax of oak-hickory or mixed-mesophytic forest. Here and there populations of this Echinacea may be seen where juniper seedlings are interspersed or young Junipers of sapling size are shading them, or may even be seen in open stands of Juniperus. However, this cone flower as is true of all others, is intolerant of real shade, hence is winnowed out eventually as the community changes to forest.

In light of the above it may be stated that E. tennesseensis may be increased by clearing away of the forest or by any forest treatment that did not involve removal of the thin layer of soil overlying the limestone bedrock. The knotty strong rhizome enables this species to resist fires such as frequently ignite the dry vegetation of open and closed cedar glades in summer.

The major threat to the species at present lies in the conversion of much of what were large tracts of cedar glade to private and public housing developments. This in fact led to the destruction of the type locality at Luvergne, Tennessee. Similarly, because of construction of the Corps of Engineers dam of the Stones River, flooding of the reservoir has further reduced the known area of the species.

#### References

Beadle, C. D. 1898. Notes on the botany of the southeastern states II. Bot. Gaz. 25: 357-361.

McGregor, R. L. 1968. The taxonomy of the genus Echinacea (Compositae). Univ. Kans. Sci. Bull. XLVIII (4): 113-142.

Quartermann, E. and T. Hemerly. 1971. Rediscovery of Echinacea tennesseensis (Beadle) Small. Rhodora 73: 304-305.

Small, J. K. 1933. Manual of the southeastern flora, pp. 1420-1421.

Revised March 1980



SPECIES: #119 Echinacea tennesseensis (Beadle) Small; Tennessee Purple  
cone-flower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect								X
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Echinacea tennesseensis (Beadle) Small



ASTERACEAE

Eupatorium luciae-brauniae Fernald

Status: Endangered or Threatened?

Technical Description:

Perennial composite from a short, thick-cylindrical, or roundish, knobby caudex, the roots diffuse-fibrous.

Stems: Erect or ascending, 1-few from the caudex, mostly 5-10 dm high, stiffish but soft, slender (2-4 mm thick), smooth, or puberulent in the inflorescence, terete, sparingly low-ribbed and sometimes grooved, proximally usually purplish, pale green above base.

Leaves: opposite, all spreading or widely ascending-petiolate, the lowest smallest, the largest above mid-stem or toward stem apex, their petioles slightly shorter than to slightly longer than the blades, green with purplish tints, slightly angulate, the blades mostly 5-10 cm long, reniform to broadly ovate or suborbicular, or deltoid, apically rounded to short-acuminate, the margins coarsely serrate-dentate, the base broadly cordate to subtruncate, the texture very thin, the surfaces soft-puberulent with simple (rarely stellate) hairs, the upper much darker yellow-green.

Inflorescence: Heads few to many in small cymes, these either solitary and terminating the axis, or developed also from subtending nodes, overtopped by or overtopping the uppermost large foliage leaves, in the latter case then with abruptly much smaller bracteal leaves, these lance-ovate, narrowly ovate, or elliptic and grading into even shorter, linear bracteoles in the ultimate inflorescence, the primary and secondary peduncles slender, erect or arching-ascending, smooth or puberulent.

Heads: campanulate, from base to tip of florets 5-7 mm high, the involucre bracts erectish, several, the longest mostly in 1 inner series, ca. 3.5 mm high, but uneven, the shorter few outermost, mostly lance-linear, narrowly triangular, or oblong-linear, mostly narrowly acute, very thin, only the mid-nerve at all prominent, pale green with tints of purple, the backs puberulent; surface of receptacle low-convex, chaffless.

Flowers: All tubular, thus regular, bisexual, 12-20/head, the corollas white, ca. 3 mm long, the slender tube ca. 1 mm long, the narrowly campanulate throat ca. 1.5 mm long, the 5, spreading-ascending, triangular teeth ca. 0.5 mm long, the surface smooth, the exerted slender style branches white, papillose.

Fruit: Akenes in outline elliptic-linear or rarely columnar, sharply angulate-ribbed, 1.5-2.0 mm long, sparsely hispidulous along the ribs; pappus of many, white, antrorsely barbellate bristles, this up to 2.5 mm long, or in the case of outermost flowers sometimes reduced to a low crown of narrow squamellae ca. 0.3-0.4 mm long.

Distribution and Flowering Season:

Shaded sandstones, ledges, rockhouses, Cumberland Plateau, Kentucky southward into northern middle Tennessee; flowering from August to frost.

Special Identifying Features:



This Snakeroot is nearest E. rugosum Houtt. (Ageratina altissima (L.) King & Robinson, but differs from that variable taxon in its lower, weaker, softer, thinner stem and leaf habit, in its smaller petiole length-leaf blade length ratio, its somewhat smaller heads, the akenes of which are hairy (rather than smooth) along the ribs.

#### Habitat and Management Implication:

This plant, as briefly noted above, is confined to shaded sandstone ledges and overhangs in what are called "rockhouses". The sandstones, depending on the formation, weather either to a nearly pure sand or a sand mixed with gravel. The best sites are where shade is provided by the cliffs and ledges plus ravine slope and bottom trees, and much of the moisture is from dripping from the rock plus mist from falling or splashing water. Sometimes the ledges or overhang bases extend for considerable distances into a cliff or ravine slope, are actually roofs of caves of various size and depth. The floors of such are often dry as well as deeply shaded and support no vegetation; however, where water seeps, drips, or otherwise accumulates at the mouths of such caves there is usually a dense line of vegetation and E. luciae-brauniae abounds. Some of its common associates are Carex (several species), Glyceria, Panicum, Agrostis, Stenandrium, Pilea, Boehmeria, Silene rotundifolia, Thalictrum clavatum, Houstonia. Ferns in genera Adiantum, Dennstaedtia, Asplenium, Dryopteris, Athyrium, Osmunda are abundant, in some places dominant. The overstory is mixed mesophytic in character, with gymnosperms such as White Pine and Canada Hemlock in frequent groves admixed, the hardwoods commonly Red Oak, White Oak, Elm, Yellow Poplar, Sugar Maple, Red Maple, White Ash, Basswood, the understory with an abundance of Rhododendron maximum, Kalmia latifolia, highbush Vaccinium, Clethra acuminata, Alnus serrulata, and Cornus.

Threats to this habitat arise from heavy logging of the steep ravine slopes which promotes erosion of the slopes, choking of the streams and ravine bases, thus burying the bases of the plants during floods. Also, such logging admits too much light, this in turn resulting in drying of the habitat as well as "burning" the foliage of such sciophytes.

#### References:

- Clewell, A.F. & J.W. Wooten. 1971. A revision of Ageratina (Compositae: Eupatorieae) from eastern North America. Brittonia 23: 123-143.
- Fernald, M.L. 1950. Gray's manual of botany, ed. 8, pp. 1361-1370.
- King, R.M. & Robinson, H. 1970. Studies in the Eupatorieae (Compositae) Xix. New combinations in Ageratina. Phytologia 19: 208-229.
- Wofford, B.E. 1976. The taxonomic status of Ageratina luciae-brauniae (Fern.) King & Robinson.

SPECIES: Eupatorium luciae-brauniae Fernald

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy	X				X	X		
Damage		NA	NA	NA			NA	
No Lasting Effect								
Beneficial if Done Properly								

Other Comments: the closely related E. rugosum, White Snakeroot, has metabolites that cause Milk Fever disease.

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Eupatorium luciae-brauniae Fern.





ASTERACEAE

Eupatorium saltuense Fernald

Status: Endangered?

Technical Description:

Erect perennial, mostly 1.0-1.5 meters tall, the short-decumbent base arising from a short, fleshy, teretish rhizome, the plants increasing by offshoots from the rhizomal crown.

Stems: 1-few in a tuft, terete and low-ribbed, toward base ca. 0.5 cm thick, with internodes short, numerous, brownish, smooth, upstem more elongate, purplish or reddish-brown, increasingly crisped-puberulent, the branches densely so, branching none or sparse below the inflorescence, the axillary shoots of main stem usually suppressed.

Leaves: opposite, the lowermost usually withering by anthesis, those at mid-stem usually largest, thence gradually reduced upward to the inflorescence and therein abruptly smaller; larger blades sessile or nearly so, somewhat folded, elliptic-linear or (mostly) lanceolate, spreading or slightly ascending, 5-10 cm long, firm, abruptly acute, the margin regularly and sharply low-serrate, scabridulous, the base cuneate, the upper surface yellow-green, usually smooth, covered with lustrous atoms of resin, indistinctly impressed-triplinerved, the lower surface slightly paler, smooth and resin-dotted save for the raised, puberulent triple-nerves and less distinct other lateral veins.

Inflorescence: basically cymose, a compound of stiffly ascending primary branches, these with spreading, lance-linear, puberulous bracts and toward apex rebranching, the secondary branches terminating in small, tightish cymules of heads, the total inflorescence then nearly as wide as long or wider, shallowly dome-shaped or flat or somewhat concave; heads mostly 5-7 mm high (from base to tip of pappus) cylindrical, the receptacle flattish, narrow, the erect bracts in ca. 3 series, erect and loosely imbricated, the outermost ones much shorter, triangular, the mid-and-inner ones mostly 4-5 mm long, oblong, apically narrowly rounded or acute (rarely acuminate), the backs puberulent, greenish and resin-gland-dotted, rounded or slightly folded along the single evident nerve, the margins toward apex broad, white, scarious, villosulous-ciliate, toward base forming a narrow white border.

Flowers: ca. 6, all discoid, all fertile, the corollas tubular, white, ca. 4 mm long, the 5 spreading lobes triangular, externally dotted with resin glands, the 2 linear style branches spreading, glistening papillate, spreading.

Fruit: akene dark brown, columnar, acutely and sharply rib-angled, glistening gland-dotted; pappus of numerous, white, antrorsely barbellate capillary bristles ca. 6 mm long.

Distribution and Flowering Season:

Sandy clay of brushy disturbed clearings, roadsides, edges of fields, Coastal Plain, southeastern Virginia (Dinwiddie, Surrey, Sussex Counties); flowering from August through September.

### Special Identifying Features:

The status of this taxon is yet argued, muddled in a maze of apomicts involving E. album, E. leucolepis, E. hyssopifolium. The most current work done on it was by Dr. Victoria Sullivan (unpublished Ph.D. Thesis, 1972) with Dr. R.K. Godfrey. They have collected from several populations and suggest that the plants are, in regard to suppressed axillary shoots, general aspect, pubescence and flowering heads, very similar to varieties of E. hyssopifolium, but are broader leaved (lanceolate rather than linear!). They opine that the broader leaf may have arisen by way of E. album L., or less possibly by genetic influence of E. altissimum L., both of which occur in the same area. I found what appears to be E. saltuense along a road in a highly disturbed, brushy ecotone between Loblolly Pine-oak flats and a somewhat higher area dominated by oak and hickory with plenty of E. album in the openings. In the same place E. hyssopifolium was abundant in clearings in both the higher and lower woods, as well as along the road. The E. saltuense was occasional, mixed with far more individuals of both E. album and E. hyssopifolium and I was able to make some comparisons in the field. E. album, a stockier, firmer and broader-leaved plant with coarser stem and leaf pubescence, showed much longer, narrower, paler phyllary tips while the E. hyssopifolium on the other hand tended to be taller, to have shorter hairs on stem and leaves, with blades mostly lineal, spatulate-linear, or elliptic-linear, with lower and fewer teeth. Thus the E. saltuense individuals give every appearance of being intermediate. Herbarium specimens show this same intermediacy.

### Habitat and Management Implication:

E. saltuense, suspected to be of recent hybrid origin probably between E. album and E. hyssopifolium var. calcaratum (Sullivan, l.c.), is to be looked for in disturbed sites where both putative parental species may grow. E. album, a common upland Thoroughwort of the area, prefers dryish sands, sandy loams or sandy clays in open stands of oak-pine or brushy upland woodland clearings and pastures created in this type. E. hyssopifolium is by far more abundant, growing in nearly any open woodlands or natural or artificial clearings nearly throughout, so long as they are not boggy or swampy. The two come together in sites such as "brushy pastures", which is what the epithet "saltuense" means. The mystery of this plant is that it is triploid, obviating a complex origin from diploid parents, in that while E. album is diploid, material of E. hyssopifolium so far studied from that area is triploid also. Another unanswered question is why, if such an event has occurred in southeastern Virginia, and if E. album and E. hyssopifolium are found in mixed populations over a many state area, are there not more examples of this hybrid (even if a small-chance hybrid)? Material identified as E. saltuense from three counties in eastern North Carolina appear more likely to be E. mohrii or E. anomalum, both putatively of hybrid origin involving other parents. One may conclude about E. saltuense only (1.) that it is suspected of hybrid origin (2.) that it occurs so far only in recently disturbed sites in which the two suspected parental types occur. Clearing of forest in areas where upland and lowland forest or field come together has, then, created the sort of intermediate habitat in which this particular plant can develop. The plants

have to maintain apomictically. Preservation depends on locating known populations and maintaining disturbance so as to prevent succession to original forest types.

References:

Fernald, M.L. 1942. Additions to the flora of Virginia. *Rhodora* 44: 461.

Johnson, M.F. 1974. Eupatorieae (Asteraceae) in Virginia: Eupatorium L. *Castanea* 39: 205-228.

Sullivan, Victoria I. 1972. Investigations of the breeding systems, formation of auto- and allopolyploids and the reticulate pattern of hybridization in North American Eupatorium (Compositae). Unpublished Ph.D. Thesis, Florida State University.



Eupatorium saltuense Fernald



ASTERACEAE

Hartwrightia floridana A. Gray ex S. Watson. Florida  
hartwrightia, N.C.N.

Technical Description

Aromatic perennial herb from a stout ascending rhizome or erect caudex.

Stems.--Solitary or few, erect, branching only in the inflorescence, purplish below, greenish toward middle and above, dotted with glistening small glands.

Leaves.--Both in rosettes (from overwintering offshoots) and on the stem, the rosette and lower ones largest, the blades oblong, linear-elliptic, to elliptic or oblanceolate, 8-25 cm long, 1-5 cm broad on slender petioles from 1/3 as long to nearly as long, the apices narrowed but rounded, the margins entire, the bases cuneate or attenuate, both surfaces dull green, glabrous, gland-dotted. Stem leaves gradually diminishing upward, alternate, ascending, becoming sessile, linear, grading into scattered inflorescence bracts.

Inflorescence.--A compound, convex cyme of cymules, the branches arching upward candelabra like, slender but stiff, elongate. Heads several to numerous per cymule, on glandular peduncles from longer than to about as long as the heads. Flowering heads with involucre campanulate, about 4-5 mm high or, with flowers, 7-8 mm high and about 1 cm across. Receptacle naked. Bracts of involucre in nearly 1 series, with a few shorter ones outside, the longest oblong, blunt, entire, greenish, gland-dotted, slightly spreading.

Flowers.--All discoid, the corollas narrowly bell shaped from a short tube, about 3 mm. high, the slightly spreading lobes triangular, the surface gland-dotted, pale lavender to white or pink. Pappus a crown of short, narrow bristles or absent.

Fruit.--Akenes oblong or narrowly obovoid, 3-4 mm long, sharply few-ribbed with the intervals concave, gland-dotted.

Distribution and Flowering Season

Sandy peat, peat or peat muck of low clearings in pine flatwoods, pineland swamps, or bogs, southeastern Georgia southward to southern peninsular Florida. Flowering October through November.

Special Identifying Features

This species is monotypic, superficially resembling some Eupatoriums, but different in pappus and akene character, in aromatic character, as well as in leaf. As Small (1933) commented, the foliage in general appearance most resembles that of the sea lavender Limonium.

Habitats and Management Implication

This species is always on wet, peat-enriched, usually sphagnum substrates, mostly in full sunlight or light shade. A typical habitat would be set in slash pine (or longleaf)-saw palmetto-gallberry-titi. Common associated herbs would be those of bogs, thus mostly grass-sedge, with an admixture of ericoids, xyrids,

bog orchids, pitcher plants (particularly S. minor), various fall flowering composites. It will often be amongst shrubby competition made up of gallberry (both species), Myrica, Magnolia, Persea, Cyrilla and various shrubby heaths, particularly Vaccinium, Lyonia.

Its range is diminishing in that habitat is lost through systematic drainage and conversion to pine plantation or to improved pasture. I have seen none where cattle are admitted, though it may be abundant just on the other side of a pasture fence. Logging of the overstory pine, including clearcutting, would favor the species. Of the various site preparations, dozing, root raking, chopping would eliminate it; bedding would have the least effect until such time as the pine crowns close. The species is probably maintained naturally through periodic fires which would remove competing shrub and grass.

#### References

Gray, A. 1898. Proceedings Amerc. Acad. Sci. 23 (Florula): 265.

Small, J. K. 1933. Manual of the southeastern flora, p.1318. Chapel Hill, N.C.



SPECIES: #68 Hartwrightia floridana A. Gray ex S. Watson. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Hartwrightia floridana Gray ex Wats.



ASTERACEAE

Helianthus carnosus Small. Lake side sunflower;  
sunflowers

Technical Description

Perennial herb from a short caudex, the roots fleshy, increasing by short lateral offshoots, these forming overwintering rosettes.

Stems.--One to few, to a meter long, erect or with bases slightly arching to the root, round in cross section or low-ribbed, reddish brown, glabrous or with a few distant multicellular hairs toward the tip.

Leaves.--Rosette and lower leaves lineal, mostly elliptic-linear, oblanceolate-linear, or spatulate, mostly 8-15 cm long, rarely more than 1.5 cm broad, obtuse to acute, sometimes callus-tipped, the margins entire, the base attenuate to a short petiole or sessile, the surfaces smooth, yellow green, and only the mid-rib evident. Stem leaves ascending, scattered, the lowest opposite, progressively shortening and narrowing upward, sessile, the uppermost ones the most distant and the very upper decimeter or so of stem naked.

Inflorescence.--Heads usually solitary or 2 at the stem tip, about 3 cm broad across the phyllaries, up to 8 cm broad from ray tip to ray tip. Phyllaries firm, flat, but loosely imbricated, the longest about 1.5 cm or less, mostly narrowly ovate, oblong or lanceolate, with acuminate to spinulose tips, entire, glabrous, mostly 5-nerved. Receptacle slightly elevated, the chaff strongly bowed at base, strongly nerved, acuminate, yellowish, smooth or minutely and distantly spreading-puberulent.

Flowers.--Ray corollas spreading, bright yellow. Disc corollas a deeper, dull yellow, narrowly funnelform from a short, sometimes puberulent tube.

Fruit.--Akenes oblong-prismatic, somewhat narrowed proximally, about 4 mm long, somewhat compressed in a plane parallel to the head center, bearing 2-4 narrow, chaffy deciduous scales but at maturity subtruncate, or with a pair of low thick teeth, smooth, gray-brown.

Distribution and Flowering Season

This species is restricted to northeastern Florida and flowers in late summer and fall.

Special Identifying Features

In size and general aspect from a distance it resembles Helianthus heterophyllus Nutt., but that sunflower has a purplish brown disc and a scabrous stem and leaf.

Habitats and Management Implication

H. carnosus is found in moist to wetish low pineland savannas, typically on black highly organic sandy peats and always in clearings.



The commonest associate species are typical of bogs and low savannas, being mostly grasses, sedges, Lycopodium, Sarracenia, Xyris, Agalinis. In nature it is probably maintained by fire such as would eliminate or reduce overstory species such as slash pine, longleaf pine and gums, and shrub understory such as gallberry, palmetto, bay. Thus clear-cutting would probably favor increase of this species; controlled burning certainly would favor it. So as well would any program that would reduce the shrub and palmetto layer and favor the increase of the grass-sedge community this species is part of. However, the pinelands in which H. carnosus grows are often being block cut, this followed by site preparation involving drainage which would eliminate all high hydroperiod soil grasses and forbs. I have seen the plants in slash pine plantings, again in areas where cleared areas are allowed to seed in with pine, but it does not seem to persist when the stand closes. I have observed it in pastured clearings and open pastured woodlands only where protected along fences.

#### References

Heiser, C. B. et al. 1969. The North American sunflowers (Helianthus). Mem. Torr. Bot. Club 22 (3): 1-218.

Small, J. K. 1902. A sea beach Helianthus from Florida. Torreya 2: 74.

\_\_\_\_\_. 1933. Manual of the Southeastern Flora: p 1436. Chapel Hill, N.C.

SPECIES: #120 Helianthus carnosus Small. Sunflowers

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Do not drain.

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Helianthus carnosus Small





ASTERACEAE

Helianthus debilis Nutt. ssp. vestitus (Wats.) Heller. hairy  
cucumber-leaf sunflower  
H. vestitus Wats.

Technical Description

Low, coarse, annual sunflower from a diffuse root, forming circular mats of procumbent or decumbent shoots that sometimes root at lower nodes.  
Stems.-- Mostly 5-8 dm long, terete and ridged, much branched to form mats or trailing with only the tips ascending, the bases dull gray-brown, roughened and relieved by the white, persistent strumose bases of hairs, distally pale yellow-green, whitened by moderate to heavy white-villous, strumose (thickened-based) pubescence.

Leaves.-- Alternate and opposite on same shoot, spreading or ascending on slender, strumose-hirsute petioles 2-4 cm long, the blades somewhat fleshy, essentially triangular, toward the acute apex entire, the mid and lower margin coarsely, saliently and irregularly toothed, the base truncate to broadly cordate or auriculate, slightly attenuated to the petiole, the surfaces equally yellow-green, strigose or hispidulous-scabrid.

Inflorescence.-- Heads solitary from leaf axils toward tips of shoots on stiffly upwardly arching, hispid-hirsute peduncles at first shorter than leaves, later elongating to become 7-20 cm long; head diameter at full anthesis (across the rays) mostly 5-6 cm; involucre and disc at anthesis hemispheric, ca. 2 cm broad, from base to convex tip of disc ca. 1.5 cm; phyllaries in several series, coarsely herbaceous, loosely imbricated, green, narrowly lance-triangular, the longest 1.0-1.5 cm long, spreading or even recurved toward the slender tips, the margins coarsely scabrid-ciliate, the backs ribbed, granular and scaberulous; phyllaries abruptly grading to chaffy pales, these firm, folded, boat shaped, oblong, the body 5-7 mm long, the outer ones obtuse, truncate, or trilobate apically, those upward in head with tips scabridulous, tridentate, the central tooth subulate, or simply subulate, this imparting a somewhat bristly look to the disc in fruit; ray florets at least 10, often 12-14, sterile, the short, tubular base erect, the ligule bright yellow, spreading, elliptical, 2.5-3.0 cm long; disc purplish-brown, the corolla symmetrical, erect, 4-5 mm long, the pale tube base inverted cupuliform, hirtellous, joined by a constriction to the swollen base of the upper tube, this cylindrical, reddish-purple, externally granular, terminating in 5, triangular-spreading-ascending, purplish lobes, these with backs scaberulous; style branches 2, the purplish, hispidulous stigma tips spreading, exerted beyond the corolla at full anthesis.

Fruit.-- Akene oblong, quadrangular, 3.5-4.0 mm long, dark gray, the faces pale-hirtellous, particularly toward the truncate summit, the pappus obsolete.

Distribution and Flowering Time

Sandy clearings in coastal hammock, dunes along the coast, beaches, southwestern peninsular Florida; flowering all year.

### Special Identifying Features

Only two decumbent, petiolate-leaved, dark-disced sunflowers inhabit the sandy coasts of peninsular Florida; the one on the east coast is ssp. debilis and from a distance it appears identical. However, a close look shows that the east coast subspecies lacks the shaggy white pubescence that marks so well the west coast subspecies, and its leaf margins are not as coarsely toothed.

### Habitat and Management Implications

As mentioned above, ssp. vestitus forms mats on deep exposures of sand toward and along the Gulf coast of southern Peninsular Florida. Usually it is in full sun, but occasionally it moves inland to sandy clearings in open slash pine-saw palmetto or into coastal tropical hammock formations, so that it can be said to be forest related at least on a successional basis as a pioneer of disturbed sandy sites. Its usual associates are those typical of sea coasts, i.e. Panicum amarum, P. amarulum, Uniola paniculata, various Cenchrus, Aristida, Dichantherium, Panicum, Eragrostis oxylepis, various dry ground Cyperus, Opuntia, Scaevola, Ipomoea pes-caprae, I. sagittata, Phyllanthus amarus, Lippia, etc. This sort of habitat is maintained by development of sandy shorelines (particularly offshore bars) by offshore sea current combined with wind and wave action to form expanses of shifting sand, or by disturbance of coastal sandy hammock to provide same. These habitats are, over time, altered and the Helianthus suppressed, by invasion of stabilizing woody vegetation, in some cases pines such as P. elliottii, P. clausa, or by evergreen scrub hammock and always saw palmetto or Sabal. Originally the plants were probably more confined to the beaches but because of the bulldozer and other land-altering machines, now occurs at greater distances inland on disturbed sands. Most of the original shoreline habitat of ssp. vestitus has been destroyed by residential and recreational development of same.

### References

- Heiser, C.B. et. al. 1969. The North American sunflowers (Helianthus).  
Mem. Torr. Bot. Club 22 (3.): 1-218.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1431-1441.

SPECIES *Helianthus debilis* Nutt. ssp. *vestitus* (Wats.) Heller  
Hairy cucumber-leaf sunflower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X					X	
Damage			NA	NA				X
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Helianthus debilis Nutt. ssp. vestitus (Wats.) Heller



ASTERACEAE

Helianthus eggertii Small. Sunflower

Technical Description

Tall (to 2.5 meters) perennial from a short, thick caudex, perennating by shallow elongate, fleshy rhizomes, the whole plant smoothish except for some slight roughening of the upper leaf surfaces.

Stems.--Erect, terete, usually purplish or reddish at least above the middle, stiffish but slender (at base hardly thicker than 1 cm), solitary or few, rarely branched save above the middle.

Leaves.--Mostly ovate to broadly lanceolate, the largest 10-20 cm long, alternate or opposite (above) the lowermost gone by flowering time, the longest at about mid-stem, the apices narrowly acute or acuminate, the margins entire, undulate or distantly and coarsely low-toothed, somewhat revolute, the bases from rounded to narrowly or broadly cuneate or acute, the petioles 5 mm long or less, the upper surfaces smoothish or sparsely scabrid, the lower surfaces glaucous. Stem leaves progressively reduced in size above middle into the inflorescence.

Inflorescence.--Compound, of few to several elongate upwardly arching branches, these with a scattering of distant, opposite leaves and terminating in one to few heads. Heads with slightly elevated chaffy receptacles, mostly 2.0-2.5 cm across the involucre and 1.5 cm from base to apex of involucre; phyllaries (bracts) narrowly lanceolate or lance-linear, loosely spreading or spreading-ascending in several series, the outermost shortest the mid and inner ones mostly 1.0-1.5 cm. long, narrowly acuminate, ciliate, greenish.

Flowers.--Ray florets about 10, the blades sterile, oblong, about 3 cm long, a rich yellow (the whole head in bloom ca. 6-8 cm broad). Disc florets slightly longer than the acute or short acuminate, ciliate chaff, the corollas ca. 5 mm long, with a short narrow tube and a narrowly campanulate throat producing 5 slightly spreading-triangular lobes. Pappus of 2-3 lanceolate or subulate deciduous ciliate or fimbriate scales.

Fruit.--Akene narrowly obovoid, prismatic, 3-4-angled, ca. 4-5 mm long, smooth, deep brown.

Distribution and Flowering Season

Sands, sandy-clays, cherts, and gravels of open upland woods, middle Kentucky southward into northwestern Alabama. Flowering August through September.

Special Identifying Features

This species has habit, stem and foliage much like H. glaucophyllus, an Appalachian species from eastern Tennessee and western North Carolina, but its heads are larger and its foliage somewhat harsher. It resembles also H. laevigatus, but has thicker rhizomes and larger heads. There appear to be no close relatives to it within its somewhat narrow range.

#### Habitats and Management Implication

A typical habitat would be open oak-hickory upland woods, usually in small natural or artificial clearings or underneath open stands. It is always on well drained soils, these usually gravelly with a high silicon content from weathered chert, and usually rather low in moisture. Its late summer herbaceous associates are other sunflowers such as H. microcephalus, H. mollis, H. augustifolius, H. atrorubens, Erigeron canadense, Liatris spp., several species of goldenrod, aster, etc., Lechea, many Lespedeza and Desmodium. Understory woody plants consist of Smilax, Rubus, Vaccinium (both high and low bush). As mentioned above, the overstory when present is usually a mixture of several species of upland oak and hickory, with an admixture of Nyssa, Diospyros, Ulmus alata, Oxydendron, Cornus. The plants are most likely to be found in the Western Highland Rim of middle Tennessee, an area which once was much given to cotton culture or to unfenced pasture in the past but much of which subsequently was allowed to go back to ungrazed forest of a low quality. Much fire used to occur in even the recent past, fire which maintained a savanna aspect in large areas. Subsequent protection from fire has doubtless reduced the area of this and several other species of herbs in that heavy resultant stands of oaks have sparse herbaceous cover beneath, or go over to much braken fern and Vaccinium.

Thus prescribed burn would (if timed properly) increase this species. Most site preparation methods would not effect H. eggertii adversely providing contiguous areas of seed source were left undisturbed. Cutting or thinning of overstory would increase this species by admitting light and reducing competition. A closed hardwood canopy would shade it out. Grazing eliminates the species.

#### References

- Small, J. K. 1933. Manual of the southeastern Flora, p. 1437. Chapel Hill, N.C.
- Heiser, C. B. 1969. The north American sunflowers (Helianthus),  
Mem. Torr. Bot. Club 22 (3): 1-218.
- Beatley, J. C. 1963. The sunflowers (genus Helianthus) in Tennessee  
Jour. Tenn. Acad. Sci. 38: 135-154.



SPECIES: #69 Helianthus eggertii Small Sunflower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Helianthus eggertii Small



ASTERACEAE

Helianthus glaucophyllus D.M.Smith

Status: Threatened

Technical Description:

Perennial, smoothish sunflower mostly (1-) 1.5-2.5 meters high, from a rather elongate, fleshy, slender rhizome and diffuse-fibrous, thickish roots.

Stems: erect, solitary or few, slender but firm, toward base mostly 5-8 mm thick, glabrous, terete, the internodes short toward base, much elongated upward on stem, there pale green, glaucous, finely longitudinally ribbed, branched usually only in the inflorescence. Leaves: opposite throughout, those of the lower stem withered by flowering time, the larger ones at about mid-stem, spreading or ascending, the petioles slender, glaucous, ciliate-based, mostly 2-3 (-5) cm long, the blades mostly lance-triangular or narrowly ovate, 10-18 cm long, to 7 cm wide, thinnish, the apex narrowly acute, the margin irregularly coarsely serrate save at base, where entire, the base narrowly to widely cuneate, the upper surface a rich deep yellow green, smooth, the lower surface much paler, even glaucous, smooth, glandless (not dotted with small resinous glands), the midrib and primary laterals raised and pale, the rest of the surface a fine reticulate of green veins. Leaf blades gradually reduced upward on stem and into inflorescence branches.

Inflorescence: heads few, smallish, on slender scabrid peduncles in cymes at tips of short, terete, slender-and-spreading primary branches from the axils of upper stem leaves, the bracts small, mostly lanceolate, entire, short-petiolate. Involucre campanulate, ca. 7 mm high (from base to tip of longer bracts), the phyllaries erectish or with tips only spreading, loosely imbricated in about 3 series, the outer ones narrowly triangular-linear, greenish, narrowly acute, scabro-ciliate, the bases firm, raised-parallel-nerved, the inner series thinner, somewhat shorter, oblong-triangular, acute, scabro-ciliate, green apically, greenish-brown and raised-nerved at the chartaceous bases; surface of receptacle convex, the chaff (pales) oblong, apically trifid with 3 narrowly acute teeth, the central one longest, ca. 5-6 mm long, pale brown, ciliate, the rounded backs strongly ribbed, hirtellous or strigillose.

Flowers: both ray and disc present, the ray florets female but non-functional, about 5, the corolla with short (ca. 1 mm) tube and spreading, elliptic-oblong, yellow ligules ca. 1.2-1.5 cm long; disc florets tubular, ca. 5 mm long, deeper yellow, the base constricted with a short, flanged or cup-like basal rim, above the constriction more broadly tubular into the throat, there with 5, erectish triangular lobes, externally smooth.

Fruit: akene oblong, slightly angulate, ca. 3.5-4.0 mm long, its apex broadly rounded or subtruncate, the surface smooth, lustrous, dark gray-brown; pappus rather early deciduous, of 4 unequal, subulate ciliate awns to 2 mm long.



### Distribution and Flowering Season:

Cool moist upland woods, Blue Ridge, western North Carolina and eastern Tennessee at elevations mostly over 2500 feet; flowering from July into early September.

### Special Identifying Features:

The smoothish, glaucous stems, tall, slender habit, strongly petiolate, mostly lanceolate leaves, and the small heads show that this species is closely related to H. microcephalus, a common and widespread, ecologically ample species throughout most of the southeastern U.S.A. The main difference is that the lower surfaces of the leaves of H. glaucophyllus are smooth and lack the resinous atoms that copiously dot the usually puberulent lower leaf surfaces of H. microcephalus.

### Habitat and Management Implication:

H. glaucophyllus is found at elevations usually above 2500 feet in the Blue Ridge mountains, usually in the shade of hardwoods or at their edges, and generally on steep slopes. The substratum is normally a sandy loam of a sandy clay loam, this often accumulating amongst granite boulders, and is moist and cool. The overstory is mainly hardwoods such as White Walnut, Bitternut Hickory, Red Oak, White Oak, Tulip, Cucumber Magnolia, Sugar Maple, Red Maple, Yellow Buckeye, White Ash, Basswood, with an understory of Cornus, Sassafras, Viburnum, Halesia, etc. Ferns such as Adiantum, Dryopteris, Thelypteris, Dennstaedtia, Athyrium are numerous. Grasses such as Bromus purgans, Agrostis, Cinna, Panicum, Brachyletrum, Elymus etc. and sedges in Scirpus, Carex, are frequent together with a rich representation of mesophytic forest herbs such as Disporum, Trillium, Polygonatum, Uvularia, Hepatica, Actaea, Cimicifuga, Ranunculus, Sanguinaria, Viola, Sanicula, Angelica, Ligustrum, Impatiens, Physostegia, Scutellaria, Campanula americana, Eupatorium (particularly E. rugosum, E. maculatum), Heliopsis, Coreopsis, Rudbeckia (particularly R. laciniata), Aster, Solidago. In the southern Blue Ridge of North Carolina this sunflower may be associated with the equally rare Coreopsis latifolia.

It may be concluded from the list of associated herbs above that this is a sunflower of moist, humic soils and full to light shade. The threat to it is therefore clearcutting of the often valuable hardwoods that provide shade and coolness, particularly if this disturbs the soil. There is resultant erosion of exposed soil together with an invasion or increase of woody weeds such as Rubus, Smilax, Lonicera, Parthenocissus, etc. On the other hand, selective or group-selective cutting would reduce such impact significantly and allow this sunflower to maintain.

### References:

- Heiser, C.B. 1966. The North American sunflowers (Helianthus).  
Mem. Torr. Bot. Club 22 (3): 1-218.
- Smith, D.M. 1958. Helianthus glaucophyllus D.M. Smith, in Brittonia  
10: 142.

SPECIES: Helianthus glaucophyllus D.M. Smith

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA		X	NA	
Damage	X				X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Range of:

Helianthus glaucophyllus D.M.Smith





ASTERACEAE

Helianthus schweinitzii T. & G. Schweinitz's sunflower

Technical Description

Perennial sunflower from a fascicle of slenderly carrot-like tuberous roots. Stems.-- Erect, solitary or few, terete and multistriate-ribbed, proximally nearly smooth and a dull brown or pale dull green, at very base 5-8 mm thick, distally becoming increasingly antrorsely strigillose, reddish, simple and leafless below by anthesis, branching only at or above mid-stem, the branches upwardly arched, candelabra-like.

Leaves.-- Opposite, the largest at about midstem (grading gradually below, where early deciduous, and above to widely scattered rameal pairs) spreading-ascending on short, strigose, clasping-based petioles 5 mm long or less, the blades narrowly lanceolate up to 14 cm long and 2 cm wide, narrowly acute, the margins somewhat revolute, entire or distantly very low serrate, the base cuneate or attenuate, the upper surface deep yellow-green, triple nerved, harsh, the lower surface strigose-tomentose with white hairs, thus paler, the midrib and laterals strongly raised.

Inflorescence.-- Heads several to many in a rather open system of upwardly arching, sparingly leafy-bracted primary peduncles these terminating in a single head or branching again in a cymose pattern, the ultimate peduncles varying in length from very elongate to a few times longer than the heads subtended; head diameter across the rays mostly ca. 4 cm, the involucre and disc at anthesis broadly campanulate, ca. 2 cm broad, 1.0-1.5 cm high from base to tip of convex disc; receptacle convex, chaffy; phyllaries very firm, green, herbaceous, in several loosely imbricate series, spreading-erect, ovate-lanceolate to narrowly lanceolate, narrowly acute or long-acuminate, the larger ones ca. 1 cm long, the margins harsh, the upper surfaces scabrid, the backs strigose-tomentose; phyllaries grading rather abruptly to oblong, keeled, apically tridentate, firm chaff 5-8 mm long, the apex hirsute-ciliate, the backs strongly multiribbed, yellow-green, smooth save for a green and white-pubescent midrib; ray florets 8-10, sterile, the ligules elliptic-oblong, ca. 2.0-2.5 cm long, spreading, light yellow, puberulent; disc corollas ca. 5 mm high, tubular, constricted just above the inverted, pale, discoid base, the limb broadly tubular, greenish-yellow, the 5 erect or slightly spreading yellowish lobes triangular, ca. 1 mm long, the spreading, linear, tapering, hispidulous stigmatic branches barely exerted at anthesis. Fruit.-- Akenes in outline oblong, somewhat widened upward, dorsiventrally somewhat flattened (in plane parallel with phyllaries), ca. 5 mm long, dark gray-brown, distally strigillose; pappus of 2-4, early deciduous, scarious, narrowly lanceolate or triangular scales.

Distribution and Flowering Time

Clearings in and edges of upland woods, local in the Piedmont of North and South Carolina, very rare in the Coastal Plain of the Carolinas; flowering from September to frost.

### Special Identifying Features

This sunflower, save for its unique, fascicled-tuberous, roots most resembles, in its small, yellow-flowered heads, sympatric populations of H. laevigatus T. & G. and narrow-leaved extremes of H. microcephalus T. & G. However it differs from both these last in its harsh upper stems.

### Habitat and Management Implications

H. schweinitzii prefers moist to dryish clays, clay-loams or sandy clay loams, these often with a high gravel content and all moderately podzolized. It is a plant of full sun or the light shade of open stands of oak-pine-hickory, the oaks being primarily upland species such as Q. montana, Q. coccinea, Q. velutina, Q. marilandica, Q. stellata, etc. the pines mainly P. virginiana, P. taeda, P. echinata, P. palustris (this last in the Coastal Plain sites), the hickories mostly Carya glabra, C. tomentosa, C. pallida. The clearings and "edges" this sunflower frequents support a wide upland grass flora composed of general Andropogon, Aristida, Panicum, Gymnopogon, Danthonia, Stipa avenacea, Erianthus, Sorghastrum, etc. many legumes, particularly in Lespedeza, Desmodium and an abundance of composites in genera Heterotheca, Liatris, Solidago, Aster, Silphium. Patches of bracken fern are abundant, admixed with large clones of Vaccinium.

Woods fires are part of the history of the vegetation of this area; many of the herbs (including the Helianthus) are cormophytic and are sun plants, thus their abundance depending on a factor such as fire reduce the shade and competition of woody plants. The greatest risk faced by this local species is that of pine monoculture, in that the stands of planted pine when properly spaced for high production are too dense, admit too little light. Areas in which there has been mechanical site preparation to the point of bare mineral earth may be colonized readily by H. schweinitzii if a seed source of that species is conveniently nearby. The problem is that, this being a very localized species, and in that site prep areas are often so very large, such seed sources are usually themselves destroyed; therefore large tracts of the former range of H. schweinitzii now lack it.

### References

- Heiser, C. B. et al 1969. The North American sunflowers (Helianthus). Mem. Torr. Bot. Club 22 (3): 1-218.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1431-1441. Chapel Hill.

SPECIES Helianthus schweinitzii T. & G. Schweinitz's sunflower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage No Lasting Effect			X					X
Beneficial if Done Properly	X				X	X		

Other Comments: Note remark about problems with site preparation!

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Helianthus schweinitzii T. & G.



ASTERACEAE

Helianthus smithii Heiser. Smith's sunflower  
H. parviflorus var. attenuatus A. Gray

Technical Description

Perennial, fleshy-rooted, from short, ascending rhizomes and from crown buds.

Stems.-- Erect, solitary or few, simple or sparingly branched below the inflorescence, terete or slightly ribbed, mostly 8-15 dm high. ca. 5 mm thick at base, mostly smooth save in inflorescence branches, glaucous, purplish or reddish-brown, brittle.

Leaves.-- Lowermost usually absent by flowering time, of those present the lower ones opposite, rarely alternate, upward on stem becoming alternate, with the largest at about mid-stem, the blades mostly narrowly to broadly lanceolate, firm, narrowly acuminate, the margins entire, often revolute, the bases cuneate, then attenuated on spreading petioles 1.5 cm long or less; upper blade surface deep yellow-green, harsh, the lower surface paler, densely golden-gland-dotted, the midrib strongly raised, strigose, the lateral veins pinnate, less conspicuous, less strigose, the surfaces between major veins usually smooth or with a wide scattering of short, appressed hairs.

Inflorescence.-- Heads numerous, in cymes, the major inflorescence branches slender, elongate, arching upward from axils of most upper leaves and with most heads produced on hairy peduncles toward the strigillose branch tips; heads mostly campanulate, ca. 1 cm high and nearly as broad across the phyllaries, the phyllaries several, loosely imbricated in several series, foliaceous, the smallest outermost and loosest, the tips often spreading, lance-linear, attenuate, the larger ones oblong-lance-ovate, narrowly nerved, smoothish; receptacle conic, the phyllaries grading into pales of similar length but oblong, firmer, browner, more strongly ribbed and apically often tridentate, the upper margins ciliate, the backs villosulous distally.

Flowers.-- Ray florets mostly 6-10, the ligules 1.0-1.5 cm long, spreading, pale yellow, elliptic-linear, ciliate. Disc florets numerous, the corollas yellow, ca. 4.5 mm long, the short tube abruptly expanded to a narrowly campanulate throat, thence into 5, spreading-ascending, short-triangular teeth.

Fruit.-- Akenes oblong-obovoid, somewhat flattened parallel to phyllaries, ca. 4 mm long, 2 mm wide, dark brown, bearing at the truncated apex 2 pale, lance-subulate, ciliate, pale scales to 2 mm long.

Distribution and Flowering Season

Dry sands or sandy clays of upland oak-pine-hickory woods, southern Appalachians, southeastern Tennessee, southwestern North Carolina, northeastern Georgia and in Alabama in the eastern mountain ranges south along the east side of the state through the Piedmont into the upper Coastal Plain. Flowering from August to frost.

Special Identifying Features

H. smithii most resembles, in fact produces intermediates with, H. microcephalus,

a common small-headed sunflower of dry sunny uplands throughout the southeast. However, that species has longer petioles (1.5 cm or more), with heavily to lightly puberulent lower leaf surfaces. In appearance H. smithii is actually closest to H. laevigatus, a rather rare sunflower of the inner Piedmont and eastern Blue Ridge of the Carolinas, also western Virginia. That species, so similar in leaf and head, however lacks the resin atoms on the lower surfaces of its leaves, whose upper surfaces are nearly smooth, rather than scabrid.

#### Habitat and Management Implications

H. smithii, according to Dr. Heiser in his recent monograph of the genus (1969), is quite rare. However, Cronquist (1977) has turned up several more specimens from recent collections of Helianthus from the southeast; it actually may be relatively abundant locally in the mountains of eastern Alabama. It is a plant of well drained, dryish, sands, sandy loams, or sandy clay loams, usually in open oak-hickory-yellow pine uplands. The pine species are usually P. echinata, P. taeda, P. palustris, P. virginiana, the oaks Q. prinus, Q. coccinea, Q. velutina, Q. falcata, the hickories Carya tomentosa, C. glabra, C. ovalis, C. pallida. Understory is usually made up of Cornus florida, Running oak (Q. stellata var.), Viburnum, with an admixture of both high and low bush blueberries, Rubus, Smilax. Herbaceous associates are the usually dry upland summer and fall flowering Desmodium, Lespedeza, Stylosanthes, Strophostyles, Potentilla, Lechea, Scutellaria, Agalinis, etc. In areas where cutting of the overstory has been extensive, H. smithii behaves as a weed as do other perennial sunflowers in the same sites (H. hirsutus, H. divaricatus, H. microcephalus, etc.) It may abound locally in areas cleared and bulldozed for pine plantation, though, being a sun plant, it is most likely shaded out as crowns close. It is in such disturbed sites that it is producing hybrids with H. microcephalus. Fire is a historical factor in the forest types H. smithii. It frequents and probably tends to increase the species by reducing woody competition.

#### References

- Cronquist, A. 1977. Notes on the Asteraceae of the southeastern United States. Brittonia 29 (2): 217-225.
- Heiser, C.B. with D.M. Smith, S.B. Clevenger and W.C. Martin. 1969. The North American sunflowers. Mem. Torr. Bot. Club 22 (3). 218 pp. illust. Durham, N.C.



SPECIES Helianthus smithii Heiser. Smith's sunflower

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy							X	
Damage								X
No Lasting Effect		X	X	X				
Beneficial if Done Properly	X				X	X		

Other Comments: invades mechanically disturbed areas!

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Helianthus smithii Heiser



ASTERACEAE

Heterotheca flexuosa (Nash) Harms. Bent golden-aster; N.C.N.  
Chrysopsis flexuosa Nash

Technical Description

Perennial herb, several shoots 30-50 cm long arising from a tuft of short-linear overwintering leaves, most of these primary shoots spreading outward briefly, then arching upward (decumbent).

Stems.--Rounded, the lower part purplish or reddish, the upper part greenish, somewhat zig-zag, slender but stiffish, the surfaces mostly with appressed, long, weak, whitish hairs. Primary shoots usually branched from all or most of the upper and middle (sometimes even lower) nodes, these branches arching upward also, thus the entire plant often quite full.

Leaves.--Alternate, numerous, linear, oblong lanceolate, or oblanceolate, the longest mostly 5-8 cm long, mostly under 1 cm. broad, spreading or ascending, the lowermost scalelike, the lower leaves often dried and gone by flowering time, the longest lowest, then progressively shorter into the inflorescence, grading finally into the bracteal leaves of the long peduncles, these short linear and under 1 cm. long.

Inflorescence.--Heads several to numerous, each one erect on slender, elongate, cobwebby-hairy peduncle, involucre about 1 cm high and less than 1 cm broad, the phyllaries (bracts) numerous, linear, in several loosely overlapping series, the outermost smallest, short-linear, the longest nearly 1 cm long, pale green with scarious margins, the apex slenderly acuminate, the surfaces eglandular or with sparse, long, mostly appressed hairs. Surface of receptacle smooth.

Flowers.--Ray flowers sterile, about 10, the ligules bright yellow, spreading, linear, 8-10 mm long. Disc florets numerous, their corollas yellow, narrowly tubular with erect, short-triangular lobes; pappus 5-7 mm long of several capillary antrorsely (upwardly) barbellate bristles.

Fruit.--Akene narrowly cylindrical, about 3 mm long, appressed-hairy.

Distribution and Flowering Season

Sandy clearings, mostly in pinelands, northwest Florida, flowering in September and October.

Special Identifying Features

This localized species is in the section Pityopsis of a genus whose limits are still argued by taxonomists. Most of the Pityopsis are species with linear, silvery or pale pubescent, monocot-like, leaves. In size character of the flowering head, this species is closest to H. graminifolia, a common species in pinelands through most of the southeast; however H. flexuosa has shorter, sometimes falcate, rather than straight, leaves, a lower habit and zig-zag stems. Indeed, it superficially is most like Heterotheca falcata (Pursh) Harms, a plant of similar habitat in coastal situations from Mass. south into New Jersey, differing from that species in minor (though consistent) characters such as pubescence, head size, akene.



## Habitats and Management Implication

H. flexuosa is always found on deep sands near the present coast, usually in sandy clearings amongst sand pine, slash pine and/or longleaf pine, there sometimes in considerable abundance. It may often be associated with several other species of Heterotheca, and other herbs of such dry sandy sites such as Polygonella, Liatris chapmanii, L. provincialis, Petalostemon caroliniense, Bulbostylis, various Panicum (sect. Dichanthelium) and Andropogon. It is frequently amongst shrubs such as Conradina, Clinopodium, Myrica, and various shrub oaks, particularly Q. myrtifolia, Q. chapmanii, Q. minima.

This is a plant of full sunlight or at most, light shade. Removal of enroaching overstory will encourage its spread. It will seed into areas within its range where site preparation involving complete removal of all cover has taken place. Prescribed burning would have an effect difficult to measure here in that this is a species of open, sandy sites where such burning is not really applicable. Natural fires have doubtless in the past been beneficial to this species in removing some competing shrubby and overstory woody vegetation.

## References

- Bowers, Frank D. Unpublished Thesis on Heterotheca - Pityopsis sect. University Tennessee, Knoxville.
- Dress, W. J. 1953. A revision of the genus Chrysopsis in eastern North America. (Unpublished Ph.D. thesis at Cornell)
- \_\_\_\_\_. 1954. Two new Floridean species of Chrysopsis Ell. (Compositae). Gentes Herbarium 8:404-409.
- Harms, Vernon L. 1969. A preliminary conspectus of Heterotheca sect. Pityopsis (Compositae). Castanea 34: 402-409.
- \_\_\_\_\_. 1974. A preliminary conspectus of Heterotheca sect. chrysopsis. Castanea 39: 155-165.

SPECIES: #70 Heterotheca flexuosa (Nash) Harms. N.C.N.

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage		X	X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Heterotheca flexuosa (Nash) Harms





ASTERACEAE

Heterotheca ruthii (Small) Harms. Ruth's golden-aster  
Chrysopsis ruthii Small  
Pityopsis ruthii (Small) Small

Technical Description

Tufted perennial herbs with slender, stoloniferous rhizomes.

Stems.-- Few to several, erect to ascending or decumbent, stiffish, terete, the bases with brownish, scaly, old leaf bases, throughout silvery-white with copious, long, appressed hairs, these admixed above on stem with short, spreading, peg-like, glandular hairs; branches few to several, upwardly arching, departing from mid-stem upward.

Leaves.-- Numerous, overlapping, in tight spirals, linear-lanceolate or gladiate, ascending or erect, mostly 2-5 cm long, narrowly acute or acuminate, entire, the bases attenuate, clasping, the surfaces silvered with long, appressed hairs.

Inflorescence.-- Of few to several heads in a cyme, the peduncles usually longer than the heads, upwardly arching, copiously spreading-glandular-hairy; heads broadly campanulate, about 1 cm high (from base to tip of disc), about 1 cm broad across top of involucre; involucre bracts lance-linear, the longest 7-8 mm long, attenuate-tipped, loosely overlapping in several series, the outermost shortest, all green with broad, pale, ciliate margins, the backs sessile-glandular.

Flowers.-- Ray florets mostly 10-15, the pappus of numerous capillary dull-white bristles, 4-5 mm long, the corollas yellow, with flattish claws ca. 3 mm long and spreading, linear-elliptic or oblanceolate blades 6-7 mm long; disc florets numerous, the pappus similar to that of rays, the corollas yellow, tubular, ca. 5 mm long, the slightly expanded throat divided into 5, triangular, erect or slightly spreading lobes.

Fruit.-- Akene lance-fusiform, 3.5-4.0 mm long, slightly ribbed, slightly compressed, the base and middle silvery-hairy, the narrowed apex smooth, the surface pale brown.

Distribution and Flowering Time

Rocky sunny bars and banks, also exposed ledges, along the Hiwassee River in Polk County, Tennessee; flowering from September to frost.

Special Identifying Features

Heterotheca ruthii is distinguished from the other grass-leaved members of its section (Pityopsis) by a combination of characters including the comparatively short, overlapping leaves which show little gradation in size from base to apex of stem, together with the glandular nature of the pubescence of peduncles, inflorescence branches, and involucre bracts. H. aspera, of the lower Gulf Coastal Plain has a similar glandular pubescence but has

longer basal leaves, a taller habit, and narrower heads.

#### Habitat and Management Implications

This very localized endemic grows only on exposures of phyllitic rock in and along the Hiwassee River upstream from Reliance and locally along the Ocoee in the same county. Usually it is in shallow moist soil pockets in cracks of the rock, associated with grasses and sedges in full sun. It is often on rocky bars in the stream itself. Damage to the habitat must have been already done by construction of a railroad along the south banks of the stream. Fluctuating stream levels because of sporadic releases from upstream damming on both streams have probably also served to reduce it through "flushing" away plants or inundating them. Logging of the cove hardwoods, hemlock, and scattered soft and hard pine of the ravines and slopes along the river has probably not been as disastrous as has the water "management" in the area.

Plants have been cultivated successfully from seed by Dr. R.E. Farmer (1977) who regards H. ruthii, when grown under artificial conditions, a good horticultural species.

#### References

- Bowers, F.D. 1972. The existence of Heterotheca ruthii (Compositae) *Castanea* 37: 130-132.
- \_\_\_\_\_. A taxonomic revision of Heterotheca sect. Pityopsis. Unpublished Ph.D. Thesis, Univ. of Tennessee.
- Farmer, R.E. 1977. Seed propagation of Heterotheca ruthii. *Castanea* 42 (2): 146-149.
- Harms, V.L. 1969. A preliminary conspectus of Heterotheca sect. Pityopsis. *Castanea* 34: 402-409.
- Small, J.K. 1897. Studies in the botany of the southeastern United States XII. *Bull. Torrey Bot. Club* 24: 493.
- \_\_\_\_\_. 1933. Manual of the southeastern flora, pp. 1340-1342. Chapel Hill, N.C.

SPECIES Heterotheca ruthii (Small) Harms. Ruth's golden-aster

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy	NA	NA	NA	NA			X	
Damage								
No Lasting Effect								
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Heterotheca ruthii (Small) Harms



ASTERACEAE

Jamesianthus alabamensis S. F. Blake & E. E. Sherff, Alabama jamesthianus

Technical Description

Perennial, from rhizomes, smoothish except for reddish gland-tipped hairs on the flower-cluster branches.

Stems: Stems up to 1.5 meters long, erect or spreading and sprawling on other plants.

Leaves: Leaves opposite, erect or spreading, up to 9 cm long, mostly oblanceolate, slender-and-sharp-tipped, entire or low-toothed, the bases rounded or cordate, the stalks short.

Inflorescence: Heads several, borne toward tips of elongate, slightly spreading branches, similar to some Beggar-ticks (Bidens) with ray flowers spreading, canary yellow, the head in full bloom about 3 cm broad. Bracts of head overlapping, thin, green; receptacle of the head cone-shaped, lacking chaff.

Flowers: Disc flowers yellow. Ray and disc flowers both fertile, producing akenes 3-4 mm long, these oblong-linear in outline, gray brown. Only disc fruit producing pappus, this of about 5, slender, deciduous, brownish bristles.

Distribution and Flowering Season

This plant is known to occur naturally in parts of two counties in northwestern Alabama, always on the banks of small streams tributaries to the Tennessee River system. It blooms in late summer and fall.

Habitats and Management Implication

The habitat is always wet, the plants occurring on wet gravelly or silty sands in places where the streams cut through shale or limestone. Usually Jamesianthus is in full sun or part shade, associated with such plants as Plantago cordata, Justicia americana, Rudbeckia fulgida var. umbrosa, Leersia, and such woody species as Alnus, Salix, together with Ulmus, Quercus of the red and white groups, Nyssa, Liquidambar and Populus. The forest of the drained banks and bluffs is typically mixed mesophytic.

This plant is rare even within its small range. It has been observed only in relatively undisturbed situations. In that it is a plant of sun, some logging of the hardwood forest of its habitat would probably not affect it adversely. Mechanical disturbance of heavy timbering of the slopes above the streams would probably affect it adversely through deposits of consequent slope erosion, through lowering of the water table or through flooding. Much of the land the species occupies is

being converted to beef cattle range, so that the trampling and grazing of creekbank vegetation by cattle could pose the greatest threat to existence of this species. Channelization projects also pose a threat.

#### References

Sherff, E. E. 1940. A new genus of the Compositae from northwestern western Alabama. Publ. Field Mus. of Nat. History, Botanical Ser. 22:399-403. 22:

Revised March 1980



SPECIES: #121 Jamesianthus alabamensis S. F. Blake & E. E. Sherff, Alabama  
jamesthianus

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy								
Damage						X		X
No Lasting Effect				NA				
Beneficial if Done Properly					X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Jamesianthus alabamensis S.F.Blake  
& E. E. Sherff



ASTERACEAE

Liatris helleri T. C. Porter. Heller's gay-feather  
Laciniaria helleri (Porter) Porter

Technical Description

Smoothish perennials from depressed-globose cormose rootstocks 2-5 cm broad. Stems.--Stiffly erect, 1-several, arising from a short crown tufted with basal leaves plus fibrous-shreddy remains of old leaf bases, to 4 dm high but usually lower, proximally purplish, distally green, strongly ribbed, angulate.

Leaves.-- Both basal and cauline, numerous, those at stem base and on short offshoots longest, often 2-3 dm long, the flat blades linear-oblongate, elliptic-linear or linear, acute, entire, tapering gradually to slender, erect, ribbed petioles, the surfaces scatteringly punctate, equally pale green, only the midrib prominent; leaves upward on stem erect, gradually reduced in their length and width, with the petioles shortening and winged, often sparsely ciliate, grading into linear bracteal leaves of the inflorescence.

Inflorescence.-- Heads somewhat scattered to approximate, axillary singly to linear bracts, sessile or nearly so in an elongate, showy, narrow determinate spike or spikelike raceme 7-20 cm long, individually campanulate, from base to tip of florets 1.0-1.3 cm long; receptacle naked, somewhat elevated; involucre bracts thinnish, imbricated in several series, the largest ones inner or medial, ca. 7-8 mm long, oblong or obovate, apically rounded, marginally ciliolate, the backs slightly rounded, longitudinally ribbed, green proximally, maroon distally and with a broadish, scarious, rosy border; all flowers discoid, symmetrical, perfect, 7-10/head, corolla pale to deep lavender rose, from tube base to orifice ca. 5 mm long, the tube scattered-pilose within, the lobes narrowly triangular, spreading, 2.0-2.5 mm long, the 2 stigma lobes long-linear, terete, well exerted and spreading, deep lavender-rose, papillose.

Fruit.-- Akene narrowly cuneiform, strongly angled and ribbed, ca. 5 mm long, the intervals shallowly to deeply concave, the surface nearly black, hispidulous along the ribs; pappus of numerous, rigidly erect, slender, pale purple, antrorsely barbed, bristles, these extending only 1/2-2/3 way to corolla throat.

Distribution and Flowering Season

On and around outcrops of granitic rock, very local, northern Blue Ridge of North Carolina; flowering from July through September.

Special Identifying Features

L. helleri in general appearance is most like high altitude races of L. spicata (var. typica, forma montana fide Gaiser, 1946) differing primarily in its internally pilose (rather than smooth) corolla tube, and its ciliate (versus entire) petioles. Within its own complex, which has corolla tubes



hairy within, it is nearest L. graminifolia, differing (dubiously) from it primarily by its much shorter pappus (which in L. graminifolia extends nearly to the disc corolla apex), and lower, stockier habit.

#### Habitat and Management Implications

L. helleri is found on the shallow, acid soils of ledges in outcrops of granitic rock in a few, scattered sumits of the Northern Blue Ridge in North Carolina. It is a plant of full sun, usually found mixed with mountain grasses, sedges and composites in shallow depressions in the outcrops or right around them. Other common associates are Selaginella tortipila, Arenaria groenlandica, Paronychia argyrocoma, Sedum telephoides, Potentilla Saxifraga michauxii, Heuchera villosa, etc. Depending on elevation the succession is toward yellow pine-hardwood (at lower summits), spruce-fire (at higher elevations), but this is a slow process. Greatest damage to the plants has actually come from commercial, recreational and/or residential development of some of the open summit country, as has been the case on Blowing Rock and Grandfather Mountain. Open areas where these plants grow should probably be fenced off to avoid needless trampling by hikers, though there would still be the question of enforcement. Since these plants are confined to outcrops or their environs, where the soil is very thin, such trees as do provide a little shade are of a poor quality, and the sites generally are unsuitable for managed forest.

#### References

- Gaiser, L. O. 1946. The genus Liatris Rhodora 48: (nos. 572-576).  
Small, J. K. 1933. Manual of the southeastern flora, pp. 1331-1335. Chapel Hill.

SPECIES Liatris helleri T. C. Porter. Heller's gay-feather

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Liatris helleri T. C. Porter





ASTERACEAE

Liatris ohlingerae (Blake) Robinson. Florida gay-feather

Ammopursus ohlingeri (Blake) Small

Technical Description

An erect perennial, usually unbranched, from a stout, thick-segmented deepset rootstock.

Stems: To 1 meter, in cross section round, with a pale dusting of short, appressed, crisped hairs.

Leaves: Numerous, spirally arranged, the lowest gone by flowering time, the lowermost longest, spreading, linear, mostly 4-7 cm long, acute-tipped, entire, the bases attenuated to a short petiole, 1-ribbed, the surfaces smooth but pitted, with glands in the pits. Lower leaves grading gradually up the stem into short bracts.

Inflorescence: Heads several but rather distant, usually 1 terminating each stiffish, elongate, spreading-ascending peduncle, cylindric-camp-anulate, from base to pappus tips 2-3 cm long and to 2 cm broad; bracts of head erect, numerous in several spirally imbricate series, oblong, obtuse or narrowly rounded, the margins finely ciliate, the backs glandular-pitted and sometimes also with a few pale, appressed short hairs.

Flowers: All discoid, the corollas a bright purple, the tubular throats expanding into 5, spreading-triangular lobes; styles elongate, projecting beyond the corolla, bright purple.

Fruit: Akenes oblong, spindle-shaped, 8-10 mm long, many-ribbed, short-haired, capped by a pappus of fine, white bristles (these finely barbed).

Distribution and Flowering Season

This species is found in the southern part of the Central Highlands of peninsular Florida, in what is called the Lake region. It blooms from July through September and October.

Habitats and Management Implication

L. ohlingeri is always found on the deep, fine-textured white sands of sandhills, usually in open stands of or clearings in the sand pine - evergreen scrub oak type. Therefore its overstory associates are rather consistent. Its shrubby associates are various ericads such as Lyonia, other composites such as Garberia, and various Hypericums, Ilex, Ceratiola, Polygonella, etc.

The species is invariably found in undisturbed scrub vegetation, but is probably maintained naturally through woods fires clearing away competing (and shading) overstory and shrub vegetation. Deep mechanical

disturbance of the soil appears to reduce it. Cutting of the sand pine, if accompanied by removal of competing shrubby growth, would tend to increase it. Its primary hazard today consists of land development with promotion either of citrus groves or real estate.

#### References

Blake, S. F. 1923. Two new composites from Florida  
Bull. Torr. Bot. Club 50:203-205

Gaiser, L. O. 1946. The genus Liatris, Rhodora 48: 331-382.

Robinson, B. L. 1934. Records preliminary to the general Treatment of the Eupatorieae XI. Contribs. Gray Herb. 104:3-49

Small, J. K. 1924. Plant novelties from Florida  
Bull. Torr. Bot. Club 51:379-393.

Revised March 1980

SPECIES: #122 Liatris ohlingerae (Blake) Robinson. Florida gay-feather

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage		X	NA					
No Lasting Effect								
Beneficial if Done Properly	(NA) X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



Liatris ohlingerae (Blake) Robinson



ASTERACEAE

Liatris provincialis Godfrey, Godfrey's gay-feather

Technical Description

Erect, simple or sparingly branched perennial herb from a round, tuberous rootstock.

Stems: To 8 dm tall, round in cross-section, longitudinally low-ridged, copiously short-pale-hairy.

Leaves: Mostly linear, the longest at stem base to 20 cm long, long-petiolate, linear-elliptic, acute, entire-margined, and sparingly long-ciliate, attenuate-based, these grading abruptly to much shorter stem leaves that are sessile, linear, narrowly sharp-tipped, then gradually shorter into the inflorescence: leaf surfaces dotted with glands and with 1, strong midrib, this raised beneath.

Inflorescence: Heads many, spreading, cylindric, in a long-cylindric inflorescence, sessile or short-stalked, from base to pappus tip 1.0-1.5 cm long, to 0.5 cm broad, mostly cylindrical, the bracts rather few, linear-lanceolate, in several spirally overlapping series, oblong, purplish, the tips acute, with a short, slightly spreading cusp, the margins ciliate toward the tip, and with a pale purplish-rose border, the backs gland-pitted, sometimes with a few short hairs.

Flowers: Heads with disc flowers only, these with bright lavender-rose or purplish corollas, these producing spreading, triangular lobes from which project narrow style branches of the same color.

Fruit: Akenes narrowly conic-cylindric, short-hairy, about 5 mm long, the pappus much longer, white, of slender, capillary, short-barbed bristles.

Distribution and Flowering Season

L. provincialis is confined to a few counties of northwestern Florida (Franklin, Wakulla) and blooms mostly in September and October.

Special Identifying Features

It is superficially closest to another Blazing star, L. chapmanii, but can easily be told in the field in that the latter has the heads more or less erect, whilst these are more spreading. Also, the foliage of L. provincialis is smoother, the leaf surfaces often being glabrous or nearly so.

Habitats and Management Implication

L. provincialis grows in sandy clearings in longleaf pine-turkey oak scrub or in the sand-pine, Ceratiola, evergreen scrub oak type. It is shade intolerant, hence is probably maintained naturally

through fire removing competing shrub and overstory. Its commonest herbaceous associates during the flowering period are various goldenrods, golden-asters, pinweeds, jointweeds such as Polygonella, etc., all species of deep, dryish sands.

The sort of clearings provided by removal through clear cutting of the pine and mechanical removal of the oaks and scrub tend to favor development of this species which seeds abundantly into the cleared areas. Deep mechanical disturbance of the sandy substrate appears to increase the species and drainage of contiguous high hydroperiod areas near the coast would provide area for it to occupy, if this be accompanied by clearing. The major hazard the species faces is therefore land development for real estate, or by establishment of a total pine overstory (which would shade it out). Block cutting of the sand pine or longleaf pine so as to have areas provided for seed to reach, would probably favor this species.

#### References

Godfrey, R. K. 1961. American Midland Naturalist 2: 466-470.

Revised March 1980



SPECIES: #123 Liatrix provincialis Godfrey. Godfrey's gay-feather

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage			NA					
No Lasting Effect		X		X				
Beneficial if Done Properly	(NA) X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Liatris provincialis Godfrey



ASTERACEAE

Marshallia mohrii Beadle and Boynton. Mohr's barbara's-buttons

Technical Description

Erect, perennial to 7 dm tall, from a short, thickened, fibrilbearing, erect and thick-rooted rhizome.

Stems.--Branching only at the inflorescence, angulate-ribbed below, often purplish, lower ridged toward the apex, there with some short, thick-tipped hairs.

Leaves.--Basal leaves longest, mostly 8-20 cm long, smooth, the petioles narrowly winged, as long as or longer than the blades which are narrowly to broadly elliptic, the tips acute but blunt, the margins entire, the base long-attenuated, the surface triple-nerved. Lowest leaves often clustered toward and around the base, these grading gradually upward to shorter, distant, stem leaves, these then grading into small, oblong or lineal inflorescence leaves.

Inflorescence.--Heads 2-10, usually several, each terminating a long, ridged, sparsely hairy peduncle in a candelabra-type arrangement, in full bloom to 2.5 cm broad and 1.5 cm high. Involucral bracts several in about 2 series, spreading ascending and loosely overlapping, linear, greenish with purplish tints, the tips acute, the margins entire with a thin, often purplish narrow border, the backs smooth, with a few, raised longitudinal nerves.

Flowers.--All discoid, the corollas whitish, with linear, spreading lobes from which project the pale lavender anthers and the narrow, blunt-tipped, whitish style branches.

Fruit.--Akenes each with a linear, firm, whitish scale at the base (the pale), this projecting bristle-like from the fruiting head. Akene body about 4 mm long, oblong and ribbed, the ribs short-hairy, the intervals with sessile resinous glands. Akene body capped by a ring of narrowly triangular, acuminate, ragged-margined, thin, whitish scales.

Distribution and Flowering Season

M. mohrii is known only from Lookout Mountain in northwest Georgia and a few counties in northern Alabama. It flowers from mid-May through June.

Habitats and Management Implication

M. mohrii is a species of grassy or grass-sedge clearings, usually moist to wet springy places, as in natural clearings of mountainous woodlands. In the one fairly large area still known for the species, the surrounding forest type is mixed-hardwood, with Shumard oak and willow oak types predominating, together with a scattering of pine. The soil is a sandy clay with a highly organic fraction, and poorly drained.



The species appears to be maintaining itself only in areas that are naturally or artificially cleared in these local "flatwoods" complexes. It definitely is reduced where the hardwoods and understory shrubs invade, and probably was maintained naturally through occasional fire or through local soil conditions that promoted a relatively closed community of grass-sedge. Clear-cutting would increase M. mohrii providing this was unaccompanied by drainage, as this is a species of high hydroperiod soil. Mechanical disturbance of the soil through preparation of the site, if unaccompanied by drainage might prepare openings for its seeds to germinate (I have observed one such event). Late season burning of the competing grass-sedge-forb complex in which M. mohrii grows would tend to maintain the species.

Opening of the stand with subsequent improvement for pasture through introduction of fescue or other forage grasses would eliminate the species as a result of competition at its root level. Cattle will feed on this species.

#### Suggested Reading

Small, J. K. 1933. Manual of the Southeastern Flora. Chapel Hill.

Channell, R. B. 1957. Contributions from the Gray Herbarium of Harvard University 181:41-132.

Revised March 1980

SPECIES: #124 Marshallia mohrii Beadle and Boynton. Mohr's barbara's-buttons

Expected effect on the species*	Management Practices							
	Prescribe burn	Bulldoze or root rake	Bed	Chop	Thin over-story	Cut over-story	Establish plantation	Graze
Destroy		X	X	X				X
Damage								
No lasting effect								
Beneficial if done properly	X				X	X		

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are rough in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Other Comments.—

Revised March 1980

Marshallia mohrii Beadle & Boynton





ASTERACEAE

Marshallia ramosa Beadle & F. E. Boynt. Southern barbara's-buttons; Barbara's buttons

Technical Description

Perennial from a short erect caudex, the roots thickish.

Stems.--Erect, 3-7 dm long, slender but stiffish, angled or finely fluted, yellow-green with (often) tints of maroon below, the lower part smooth, the upper part smooth or with scattered short, crisped hairs.

Leaves.--Both in rosettes and on the stem, the lowest largest, with blades from elliptic to oblanceolate, linear or elliptic-linear, variable in length from 5-20 cm the apices rounded even if narrow, the margins entire, the surfaces yellow-green, smooth, triple-nerved, the bases attenuated to an ascending maroon petiole less than 1/2 the blade in length.

Inflorescence.--Branches (peduncles) arising from about mid-stem upward from the axils of much smaller upper stem leaves, slender, elongate, short-bracted, with a scattering of short, crisped hairs, upwardly arching candelabra-like to produce a more or less open, flat-topped cyme. Heads/inflorescence mostly 3-9, usually but one terminating a branch (rarely 2), mostly hemisphaeric, from base to bract-tip 5-7 mm high, 10-12 mm across, in flower from head base to corolla tips 10-15 mm and 15-20 mm across. Bracts of head several, loosely imbricated in 2 weak series, elliptic linear to oblanceolate, 5-7 mm long, acute or mucronate or short-acuminate, greenish, entire with narrow pale margins.

Flowers.--All discoid, all fertile, the corollas 6-7 mm long, with a long, slender tube, a short, campanulate throat and 5 long, slender spreading lobes, pale lavender and covered externally with pale crisped hairs. Anther head projecting conspicuously above the spreading petal lobes, a deeper lavender.

Fruits.--Akene broadly wedge-shaped, angled (prismatic), about 2 mm long, the angles ascending-bristly-hairy, the tip capped by a crown of narrowly triangular, acute to slender-tipped, thin scales, these often bronze with purplish tints.

Distribution and Flowering Season

Dry to moistish sandy outcrops or sandy rises in longleaf wiregrass pinelands, south-central Georgia and northwestern Florida (Washington County); flowering from late May through June.

Speical Identifying Features

In appearance of leaves it is nearest M. graminifolia and M. tenuifolia, which do overlap its range, but these plants do not bloom until late summer and fall. In character of pappus (scales) it is nearest M. caespitosa, but this complex species is always west of the Mississippi River.

Habitats and Mangement Implications

This species is thought to be confined to and around the Alatomaha Grit outcrops of south-central Georgia and its one outcrop occurrence in north-

west Florida (Rock Hill). This is a highly ferrugineous sandrock, and the plants are usually rooted in pockets thereon, or nearby. The same situations harbor the also rare (and threatened) Penstemon dissectus. M. ramosa, though considered rare, is locally abundant and forms small, but showy patches within its small range. It is usually in full sun, associated with wiregrass or with grass-sedge and other savanna formation plants where the overstory is mainly a scattering of longleaf pine, or it may actually be found on bog edges in more humified sands. Its being on and around outcrops protects it from most agricultural activity save for pasturing. Prescribed burning would probably favor the species, together with the other savanna formation forbs it associates with. Removal of the sparse pine overstory would probably increase its local area. Most methods of site preparation would be inapplicable in its habitat, though plantings of slash pine have to some extent been intrusive. Where such plantations are developed, this species is eliminated through shade, at least until such time as planted stands "open up."

#### References

- Channell, R. B. 1956. A revisional study of the genus Marshallia (Compositae),  
Contribs. Gray Herb., CLXXXI: 41-132.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1455-1457. Chapel Hill, N.C.

SPECIES: #38 Marshallia ramosa Beadle & F. E. Boynt. Barbara's buttons

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy				X			X	
Damage								X
No Lasting Effect			X					
Beneficial if Done Properly	X	X			X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Marshallia ramosa Beadle & Boynt.



ASTERACEAE

Polymnia laevigata Beadle

Status: Threatened?

Technical Description:

Pungently aromatic, annual or perennial, bolting from overwintering rosettes, the roots shallow, tap or branched tap, fleshy, strongly tapering, with fibrous laterals.

Stems: one or few from the rootstock, from 1.0-2.5 meters tall depending on moisture and richness of substrate, slender (mostly 0.5-1.5 cm thick at base), stiffly erect from a short-decumbent base, fistulose, toward base and at nodes and young tips frequently purplish, otherwise pale green, by anthesis smooth, terete, multi-low-ribbed, the nodes toward base crowded and swollen, upward with internodes longer, branching usually only in the upper half, the branches slender, divaricate, opposite, the plant crown therefore broad. Leaves: opposite, spreading or ascending, the lowest and those of rosettes withering by flowering time (save for those of rosettes that do not bolt!), the largest leaves either at very base in spring or in the upper part of the stem subtending branches, these 15-25 (-30) cm long, the slender petiole 1/4-1/2 the total length, aging smooth or with some villous hairs along the grooved upper side, the blades mostly elliptic, deeply incised-pinnatifid, the lowest lobes very short and distant, the larger lobes, including the terminal, oblong or triangular, their tips narrowly acute or acuminate, their margins saliently triangularly relobed or toothed, the sinuses rounded, sometimes nearly closed, the upper surface a rich dark green, smooth save for the puberulent major pinnate veins and midrib, the lower surface paler, similarly smooth, even to the raised pale veins. Blades of upper stem and branches increasingly distant, more sessile, less lobed, the uppermost ones often triangular-hastate, those of ultimate branchlets becoming lance-linear or elliptic-linear, less than 2 cm long.

Inflorescence: heads small, mostly 5-6 mm high, in small cymes, these short-stalked, diffusely arranged on slender, villosulous primary peduncles, or even solitary; involucre very broadly campanulate or cup-shaped, rather loose, the outer phyllaries cupped, foliaceous, green, in few series, the outermost ones narrowly triangular or oblong-lanceolate, to 5 mm long, obtuseangled or rounded, ciliate, the backs smooth or sparsely appressed-puberulent, the inner broader, somewhat shorter or longer, mostly broadly ovate to suborbicular, strongly cupped, apically broadly rounded, marginally ciliate, the backs appressed-puberulent, these grading inward to broadly oblong or oblanceolate, thinner and greenish-tipped chaff on the somewhat elevated receptacle.

Flowers: ray florets 5 or fewer, fertile, strictly female, the corollas white, dotted with short, glandular hairs, the tube villosulous, the ligule spreading, apically toothed, mostly broadly obovate, ca. 3 mm long, the 2 style branches slender, spreading-recurved; disc florets strictly male, ca. 15, the corollas with narrowly tubular base to 2.5 mm long, the throat short, broadly campanulate, the lobes erect or slightly spreading, triangular, the surface smooth, greenish-yellow or yellowish-white.

Fruit: akene obovate, ca. 3 mm long, short-stalked, subangulate, longitudinally with ca. 5 low ribs, the broadly rounded or subtruncate and indented apex with the pappus forming a short, narrow crown, the fruit surface dark brown, minutely appressed-puberulous.

#### Distribution and Flowering Season:

Rich wooded slopes, shaded limerock outcrop areas, scattered localities in Cumberland Plateau, Coastal Plain, and Interior Highlands, Kentucky, Missouri, Arkansas, Tennessee, northern Alabama and Georgia, northern Florida. Flowering from July (June in Florida) to frost.

#### Special Identifying Features:

P. laevigata is vegetatively rather similar to P. canadensis, and may be actually in mixed populations with it as well as with the showy-liguled P. uvedalia L. which it resembles not at all. It is distinguished from the former by its smoother, more deeply dissected leaves and narrower leaf segments, its smaller heads, and its akenes which are 4-5-angled rather than 3-angled.

#### Habitat and Management Implication:

P. laevigata is probably more abundant in the Cumberland Plateau of southern Tennessee than anywhere else in its known range. Usually the plants are in rocky woods, in light to dense shade of mixed mesophytic woods, on moist loamy substrates which may comprise deep soil pockets around or shallow deposits over ledges and large rocks. While early descriptions of habitat indicate that the plant favors somewhat acid soil, this is not always the case. Usually the plants are most abundant over limestone, although this may have over it a detritus of large and small sandstone boulders from upslope, and the soil it is rooted in is often high in clay or is a clay loam. In Jackson County Florida, where it abounds locally in Marianna Caverns State Park, the plants are particularly common on thin moist soil mantles directly over limerock.

As stated above, the best plants appear in shade of mixed mesophytic forest and on moist loamy and rocky substrates. The overstory has in it White Oak, Red Oak (in localities north of Florida), Shumard Oak, Yellow Oak, Beech, Bitternut Hickory, Elm, Black Locust, White Ash, Sugar Maple, Basswood, Tuliptree, various Magnolia, etc. Herbaceous associates are the typical herbs of rich woods, with abundant ferns, woodland grasses in Chasmanthium, Festuca, Bromus, Brachyletrum, Poa, Elymus, abundant carices, Muhlenbergia, Polygonatum, Uvularia, Trillium, Smilacina, Hepatica, Actaea, Delphinium, Aquilegia, Sanguinaria, Urtica, Laportea, Tovara, Sanicula, Thaspium, Zizia, Lysimachia, Phlox, Scutellaria, Campanula americana, Impatiens, and an abundance of composites in Aster, Eupatorium (particularly rugosum), Solidago, Helianthus, etc.

Such sites produce valuable hardwoods and most have been logged at least once; only the steepness of much of the terrain and the



rockiness of the soil have prevented even more severe impact. In places where I have seen the effect of logging, it is most adverse where an area has been clearcut, in that erosion is severe, washing away the soil in which the Polymnia roots. The increased light dries out the soil. Also, such operations are usually followed by a massive invasion of undesirable and rank weeds, vines and shrubs (i.e. Lonicera, Pueraria, Rubus, Smilax, Rhus, etc.) which tend to put a lot of pressure on other less aggressive species.

References:

- Beadle, C.D. 1898. Polymnia laevigata Beadle in Bot. Gaz. 25: 278.  
Small, J.K. 1933. Manual of the southeastern flora, pp. 1406-1407.  
Wells, J.R. 1965. A taxonomic study of Polymnia (Compositae).  
Brittonia 17 (2): 144-159.

SPECIES: Polymnia laevigata Beadle

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		NA	NA	NA		X	NA	
Damage	X				X			X
No Lasting Effect								
Beneficial if Done Properly								

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Distribution of:  
Polymnia laevigata Beadle





ASTERACEAE

Prenanthes roanensis (Chick.) Chick Piedmont rattlesnake-root; Rattlesnake-Root  
Nabalus roanensis Chick.

Technical Description

Perennial herb from a thickened-tuberous, erect caudex (this and all other parts with milky juice), this in winter producing a rosette of long-petioled, triangular-bladed leaves.

Stems.--Erect, to 1 meter all, basally terete, toward apex often fluted or angulate, greenish or maroon, smooth below, toward the apex often with short, crisped hairs.

Leaves.--Rosette and lower leaves usually absent by flowering time, the lowest evident ones long petiolate, alternate, highly variable but blades usually of an ovate or triangular type, the margins irregularly or evenly dentate or denticulate, the apices acuminate, the bases hastate, truncate or broadly rounded, rather abruptly then attenuately narrowing to the petiole, the upper surface dark green, smooth save for short bristles along the midrib, the lower surface paler, short-hairy along the main veins: leaves becoming smaller, with shorter petioles or sessile toward the upper nodes, all the upper ones subtending inflorescence branches.

Inflorescence.--Mostly cylindrical, leafy, of several to many ascending short to somewhat elongate short-hairy branches, these terminating in dense, semicircular cymose clusters of nodding heads. Heads on short-recurved densely crisped-hairy, short-bracted peduncles, narrowly campanulate-cylindric, ca. 1.5 cm long; receptacle naked; phyllaries mostly in 2 series, the outer short, triangular, the inner linear, 5-9, about 1 cm long, blunt-tipped, entire, erect, thin, green sometimes with tints of maroon at tips, the margins thinner, broad, pale, entire, the backs with long, rather stiffish, sordid to nearly black hairs.

Flowers.--All radiate, mostly 5-9/head, the corollas each with a narrow tube ca. 3 mm long and a short-linear, yellowish green blade (ligule) ca. 4-4.5 mm long, this slightly spreading away from the erect (downward-pointing) exerted anthers.

Fruit.--Akenes subcylindric or somewhat angulate, sometimes broadening slightly toward apex, 4-5 mm long, pale brown, smooth. Pappus of numerous yellowish-white, capillary, finely barbellate bristles, in fruit about 7-8 mm long.

Distribution and Flowering Season

Moderate to high elevations in the Blue Ridge and Valley and Ridge provinces of the Appalachians from western Virginia southward through western North Carolina and eastern Tennessee. Kentucky? Flowering from August to frost.

Special Identifying Features.

This species, with its yellowish-green corollas and its hairy phyllary backs is closest to P. aspera but this is a stockier, taller species of prairies to the west and has oblanceolate or spatulate, coarser leaves together with a racemose inflorescence and paler phyllary hairs. It for the same reasons is near P. serpentaria, a plant of lower elevations in the southeast, but that species tends to have more lobate leaves, a broader inflorescence, and more phyllaries/head.

#### Habitats and Management Implication

P. roanensis usually found on dark, well drained sandy loams either in clearings at or toward summit elevations or in grassy balds. It is not a plant of heavy shade, so when found in forests, it is usually toward the edges. The forest types it is commonest in are fir, spruce-fir, spruce-hemlock-yellow birch, or hemlock-birch-maple. Where there has been fire it may be found around fire-cherry and aspen. There is therefore reason to suspect that fire may increase it by eliminating woody competition and/or shade. Clear cutting would favor its increase, but most known localities for Prenanthes roanensis are not at present being cut.

#### References

- Milstead, W. L. 1964. A revision of the North American species of Prenanthes. pp. 1-223. Unpublished Ph.D. thesis.
- Radford, A. E., Ahles, H. E. and C. R. Bell. 1968. Manual of the vascular flora of the Carolinas, p. 1020. Chapel Hill, N.C.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1490-1492. Chapel Hill, N.C.

SPECIES: #4 Prenanthes roanensis (Chick.) Chick.; Rattlesnake-Root

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Prenanthes roanensis (Chick.) Chick.



Paper 5  
Text & map by:  
Robert Kral

#### ASTERACEAE

Rudbeckia auriculata (Perdue) Kral. Bared coneflower;  
cone flower; blackeyed susan  
R. fulgida Ait. var. auriculata Perdue

#### Technical Description

A large smoothish perennial herb to 3 meters tall from stout rhizomes and increasing by slender rhizomatous offshoots.

Stems.--Arising from very leafy, overwintering rosettes, erect, stiffish, fully 1 cm thick below, terete but usually with many low ribs.

Leaves.--Rosette and lower stem leaves to 6.5 dm long, the blades oblong to oblanceolate or ovate-lanceolate, tips short acuminate to rounded or acute, entire to sinuate, crenate, dentate or coarsely toothed, on long petioles, the surfaces smooth to scabrous or strigose on the veins below and on the petiole. Middle and upper stem leaves sessile, progressively reduced up the stem, elliptic to ovate or fiddleshaped, the bases clasping, auriculate.

Inflorescence.--Heads many in an open broad, paniculate cyme on short to elongate, short-bracteate stalks. Involucre with greenish, stiffish bracts, these oblong-linear, spreading, shorter than the rays, smooth save for scabrous edges. Receptacle elevated, the chaff oblong-cuneate, about 6 mm long, acute, ciliate, the backs with small hairs, the tips deep reddish-brown.

Flowers.--Ray florets with ligules bright yellow, oblong-linear, ca. 2 cm long, spreading-ascending, the backs often short-hairy. Disc 1.0 - 1.7 cm broad, the corollas purple-brown, 3.0-3.5 mm long, the short tube expanding to a narrowly funnelform throat, the lobes short-triangular and erect.

Fruit.--Akenes oblong-curved, 4.0-4.5 mm long, a rich, shining, reddish-brown, 4-ribbed, the pappus unevenly 4-6-toothed, the teeth pale tan, rigid, narrowly triangular, up to 2 mm long.

#### Distribution and Flowering Season

Bogs, seeps, swamps, ditches and swales, in Alabama mostly Coastal Plain, rarely in contiguous areas of Appalachian Alabama. Flowering from August to early October.

#### Habitats and Management Implication

R. auriculata is a plant of highly organic, high hydroperiod substrate of varying reaction, ranging from nearly neutral to quite acid (on the basis of associated species). Usually it is in full sunlight, sometimes in the partial shade at edges of hardwood swamps. In bogs and seeps, it will appear in clearings amongst Alnus, Myrica, Cephalanthus, Cyrilla in association with various sedges (particularly Rhynchospora) and wetlands grasses, bog orchids and liliaceae. While its populations are quite scattered and local, such are usually made up of one or more very large clones which may dominate a small area. The plants are fully the height of robust R. laciniata which at a distance they slightly resemble, but in character of head are much more like R. nitida and in total character are unlike any other species of Rudbeckia. A logging of the low hardwood stands it often grows around or in would probably increase its habitat providing this was not accompanied by drainage. The same could be said of

the pine flatwoods areas it is in. Any site preparation involving drainage would eliminate the species. It would not survive under the closed canopy of pine plantation or dense hardwood regeneration.

#### References

Kral, R. 1975. Rudbeckia auriculata (Perdue) Kral, a species distinct from R. fulgida Ait. *Rhodora* 77 (809): 44-52.

Perdue, R.W., Jr. 1957. Synopsis of Rudbeckia subgenus Rudbeckia. *Rhodora* 59: 293-299.

\_\_\_\_\_. 1961. A new variety of Rudbeckia fulgida. *Rhodora* 63:119-120.



SPECIES: #5 Rudbeckia auriculata (Perdue) Kral, Cone flower, Blackeyed susar

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect	NA							
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Drainage will also destroy

Rudbeckia auriculata (Perdue) Kral



ASTERACEAE

Rudbeckia heliopsidis T. & G. Sun-facing coneflower;  
black-eyed Susan

Technical Description

Perennial herb forming large clones by means of spreading-branching systems of elongate, thickish rhizomes, the branches terminating in overwintering rosettes of strongly petiolate leaves.

Stems.--Arising usually singly from each rosette, mostly between 0.5 and 1 meter tall, erect or decumbent, slender but stiffish, at base perhaps 4 mm thick, terete and dull green, many ribbed and hirsute toward base, upwardly smoother or smooth, sometimes slightly angulate, often with some maroon tints, usually branching only in the inflorescence.

Leaves.--Rosette leaves the largest, from new rhizomal branches produced as the flowering shoots develop from the old, the blades mostly ovate or broadly lanceolate, 6-15 cm long, acute or short-acuminate, distantly or closely serrate, the bases abruptly attenuate, the upper surfaces dark green with a scattering of short appressed hairs (strigillose), the lower surfaces paler, sparsely hirsute along the veins; petioles elongate, slender, longer than or as long as the blades, villous hirsute or hirsute. Lower stem leaves similar to rosette leaves or slightly smaller, often absent by flowering time, scattered sparingly up the stem, becoming progressively shorter petioled, smaller, and more ovate, each from about mid-stem upward subtending an upwardly arching, stiffish inflorescence branch, the lower ones of these either simple or sparingly rebranched.

Inflorescence.--Branches of inflorescence simple or with 1 or 2 stiffish branches, elongate, sparingly bracted with small ovate bracts, each terminating in a long-pedunculate head. Head short-conic, 7-9 mm high, mostly around 10 mm. broad, the phyllaries green, lance-linear, 5-7 mm long, rather loosely imbricated, spreading or reflexed, slenderly acute, or acute, subentire, the outer surfaces tomentose with pale hairs. Receptacle of head conic, the chaff oblong, acute, or broadly rounded, the outer surface of the tips with whitish hairs (some club-shaped) often admixed with sessile white glands, the upper margin ciliate or erose.

Flowers.--Ray flowers sterile, 7-10, the ligules oblong, 1.5-2.0 cm long, spreading, 2-toothed at apex, a clear bright yellow. Disc florets very numerous, the corollas 3.0-3.5 mm long, with a short tube, a slightly expanded tubular throat, and short, triangular, spreading or reflexed lobes, reddish-brown.

Fruit.--Pappus vestigial, the akene apex with very low bluntly triangular teeth at the angles and a rim of short-stalked glands: akene oblong, ca. 3 mm long, usually 4-angled dark brown or nearly black, the ribs and interfaces sometimes with a scattering of pale hairs.

Distribution and Flowering Season

Small seeps, ditches, boggy places, usually over sand or siliceous rock or in wet to moist depressions in outcrops of siliceous rock, mostly Piedmont and Appalachian Plateau of eastern Alabama and western Georgia with outliers in the inner Coastal Plain of Harnett Co. North Carolina and in the Blue Ridge of South Carolina (Oconee County) Flowering from late July into late September.



### Special Identifying Features

Sections in Rudbeckia are distinguished on the basis of fine characters involving chaff (pales) and character of stigma tips. This species has blunt, hairy chaff tips and stigma tips that are short and obtuse, which distinguish it from most of the common Rudbeckias. Its closest relatives have either larger heads or sessile lower stem leaves or both. The only species with which it would be associated in the wetlands it frequents is R. fulgida, a highly variable but smoother species with more deeply yellow (orange yellow) rays and a totally different chaff and pappus character.

### Habitats and Management Implication

The forest type in which R. heliopsidis is found in is mostly either upland oak-hickory or oak-pine-hickory or open pine-mixed hardwoods (as in the Little River Canyon of northeastern Alabama). It is a plant of seeps, bogs, sandy wet clearings along rivers, always on wet sandy-organic substrates. Most of it is in out-crop areas or very bouldery situations, poorly suited to most agriculture. The seeps it frequents are usually quite acid, mostly populated by grasses, sedges and herbs of bogs (including the rare Sarracenia oreophila in northern Alabama). Logging of the mostly low-quality forest around it, so long as drainage was not involved, would probably effect this species very little unless it would be to increase its area as it freely seeds into wet sandy places. Thus far, its main enemies appear to be drainage of some upland swales for farming or pasture, or simply grazing. It does not hold up well under grazing.

### References

- Radford, A. E., Ahles, H. E., and C. R. Bell. 1968. Manual of the vascular flora of the Carolinas, pp. 1108. Chapel Hill, N.C.
- Small, J. K. 1933. Manual of the southeastern Flora, pp. 1422-1424. Chapel Hill, N.C.

SPECIES: #6 Rudbeckia heliopsidis T. & G. Black-eyed susan

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	?				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rudbeckia heliopsidis T. & G.





Text & map by:  
Robert Kral

ASTERACEAE

Rudbeckia nitida Nuttall

Technical Description

Tall smooth perennial from a stout, erect or ascending caudex, perennating and forming small clumps by lateral crown buds, the roots thick.

Stems.--Stiffly erect, 5-15 (-20) dm high, terete, green with several strong yellow-green ribs, lustrous, the upper part sparingly branched or branchless, nearly naked, scape-like.

Leaves.--Simple, alternate or basal, the rosette and scattered basal leaves largest, 1-5 dm long, 1/2 or more petiole, this strongly ribbed and toward base abruptly clasping, often purplish or pink, the blades firm, lustrous yellow-green, elliptic, elliptic-linear, narrowly to broadly obovate or oblanceolate, ascending or erect, acute, with thick, pale, lightly scabrid edges, these either entire or distantly low-serrate or denticulate, the base attenuate, the upper surface with 3-5 (-7) prominent, pale, arcuate veins and reticulate interveins, the lower surface with veins even more raised. Cauline leaves increasingly distant and much reduced upward on stem, where sessile, grading to very distant small peduncular bracts or absent save as scales subtending branches.

Inflorescence.--Heads showy, long-pedunculate, often solitary or in ones or twos on a few elongate upcurved branches overtopping the central older head, thus the total inflorescence often a sparse-headed cyme. Phyllaries spreading-recurved, basally imbricate in few series, lance-triangular or lance-ovate, 5-10 mm long, acute, firm, green, firm, with thickened slightly scabrid margins, only the mid-nerve evident, the backs hirtellous. Receptacle strongly elevated-conic, the fruiting head ovoid to short-cylindrical, 2-4 cm long, in flower purple-brown. Chaff barely overtopping pappus of ripe fruit, narrowly obovate-spathulate, apically nearly rounded to short attenuate-acute, the strongly rounded convex backs pale strigillose, the margins firm, entire, the submargins presenting a somewhat impressed, viscid, purplish-brown or deep green band, the cuneate base yellowish, cartilaginous.

Flowers.--Ray flowers sterile, the ligules mostly 8-12, at first spreading, then reflexed, elliptic-linear, 4-5 cm long, lemon yellow, the narrowly rounded apex low-toothed, the backs hirtellous. Disc flowers with corollas ca. 3 mm long, deep purplish-brown, the tube short, widening into a campanulate throat and limb, the 5 lobes erect or ascending, short-triangular, ca. 0.5 mm long; style branches purple-brown, barely exsert, spreading-recurved, the appendages short-conic, broadly acute, bristly.

Fruit.--Akenes with body oblong-cuneate, prismatic, strongly 4-ribbed, ca. 3-5 mm long, smooth, olivaceous or greenish purple, near black, the pappus an erect, irregularly 4-toothed crown ca. 1 mm high.

Distribution and Flowering Season

Wet or moist low meadows, flatwoods, ditches and bog edges, mostly in pinelands, mostly Coastal Plain, eastern Georgia and northern

Florida west to panhandle Florida and one county in eastern Alabama (var. nitida); in the Gulf Coastal Plain from Louisiana west into eastern Texas (var. texana Perdue). Flowering mostly from June into August, intermittently to frost if disturbed.

#### Special Identifying Features

The above description is of var. nitida-which has slightly narrower leaf blades, slightly shorter receptacles, and usually much smaller akenes. R. nitida proper is distinguished from most other tall rudbeckia that have short style appendages by a combination of (1.) glabrous, shining, entire or subentire leaves and (2.) large, much-elongating heads. These features, plus the bristly hairy and viscid chaff apices place it next to R. maxima Nutt. a giant from the lowlands of the Gulf Coastal Plain of Louisiana west into Texas and north into Missouri. This last, an even taller plant, is markedly glaucous, has much larger and broader leaf blades, has heads elongating to 4-8 cm at maturity.

#### Habitat and Management Implications

R. nitida is a plant of wet to moist acidic clearings in pinelands, either flatwoods, savanna or swales in longleaf pine hills. Its commonest associates are grasses and sedges in Andropogon, Aristida, Panicum, Rhynchospora, Scleria, Scirpus, Carex, many savanna or bog dicots and monocots, particularly Xyris, ERIocaulon, Lachnocaulon, Polygonum, Ludwigia, Sarracenia, Pycnanthemum, Lycopus, Rhexia, many lowland composites in Coreopsis, Helianthus, Eupatorium, Liatris, etc. It is a sun plant, historically maintained by fire which produces the low savanna which is its best habitat. Site preparation accompanied by ditch drainage eliminates it and much of its former habitat is now pine plantation.

#### References

- Cronquist, A. 1980. Asteraceae in Vascular flora of the southeastern United States, Vol I:23-28.
- Small, J.K. 1933. Manual of the southeastern flora, pp.1422-1427.

SPECIES Rudbeckia nitida Nuttall var. nitida

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments: Site drainage destroys this wetlands species.

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Rudbeckia nitida Nutt. var. nitida



ASTERACEAE

Rudbeckia triloba L. var. pinnatiloba T. & G. pinnate-lobed black-eyed  
susan  
R. pinnatiloba (T. & G.) Beadle

Technical Description

Taprooted, annual herbs.

Stems.-- Erect or ascending, to 1 meter tall but usually lower, terete, simple below the inflorescence or prolifically branched with branches ascending, terete, strongly reddish-purple-tinged, multiribbed often with heavy spreading or retrorse shaggy pilosity at least on the lowermost nodes and internodes, at mid-stem and above softly hirsute and/or strigillose.

Leaves.-- Rosette leaves usually withered by flowering time, spreading, to 1 dm long, pinnately lobed, the few segments spreading or ascending, mostly oblong or lanceolate, pale yellow green, hirsute; stem leaves alternate, spreading, the lower ones similar to rosette leaves and strongly petiolate, then progressively smaller upward on stem, becoming sessile, elliptic or elliptic linear, acutish, entire or serrate, the bases cuneate, the surfaces pale yellow-green, beneath both hirsute and hirtellous, above hirsute and hispid-hirsute.

Inflorescence.-- Heads several to very many (depending on luxuriance of plants) usually one or few, strongly pedunculate on the arching-spreading-ascending, stiffish inflorescence branches, thus the heads in broad or narrowish panicles. Receptacle of head conic, 1.0-1.5 cm broad on a strigose peduncle longer than the head; involucre bracts green stiffly spreading, broadly linear or narrowly triangular or lanceolate, 0.7-1.0 cm long, acute, entire, strigillose or even with bases beneath shaggy-hirsute with pale hairs; chaff stiff, translucent, oblanceolate, strongly subulate-tipped, these tips dark purplish-maroon, the body bearing submarginally on each side a strong maroon or purple band.

Flowers.-- Ray florets sterile, mostly 8-10, the ligules above the short corolla tube flat, spreading, elliptic or oblong-elliptic, mostly 1.0-1.5 cm long, a rich orange-yellow, papillose; disc florets very many, shorter than the bristly tips of the chaff, tubular, ca. 3 mm long, the pale tube dilating gradually into the throat, the throat and the 5 erect, triangular lobes deep maroon; stigma tips blunt, covered with clavate, purplish-brown trichomes.

Fruit.-- Akene broadly wedge-shaped, quadrate, ca. 2 mm long, deep reddish-brown, smooth, the truncate apex with pappus a low, short-lacerate crown, this producing a short cusp at each of the 4 angles.

Distribution and Flowering Season

Thin soils over calcareous rock, glades, clearings, open calcareous woodlands, very local but locally abundant, northwestern Florida, inner Coastal Plain Alabama and western North Carolina; flowering from late July to frost.

Special Identifying Features

The species R. triloba is distinguished from other sympatric Rudbeckia by its

annual character combined with short, blunt style tips and subulate chaff-tips. The variety is distinguished by its 5-7-lobed pinnation of its rosette and lower stem leaves and to a lesser degree by the pale, dense, usually spreading or somewhat reflexed pubescence of the lower stem (this last not a constant character!).

#### Habitat and Management Implications

Rudbeckia triloba pinnatiloba prefers basic soils, these usually shallow, dryish, well-drained, derived from chalks, marls, limestones, and usually sunny. Thus, it is generally found in open woodlands or in small natural or artificial clearings. The surrounding forest is often a mixture of Juniperus, calciphilic oaks such as Quercus shumardii, Q. muhlenbergii, Q. durandi, etc. Ulmus americana, U. rubra, U. alata, Bumelia, Rhus (particularly R. aromatica), Rhamnus, Cercis, Carya ovata, C. carolinae-septentrionalis, etc. In the clearings it is often associated with Thaspium pinnatifidum, Zizia, Delphinium carolinianum, Lithospermum canescens, L. tuberosum, Phlox pilosa, various Sporobolus, Panicum, Melica, Bromus, Elymus. In the open woodlands it is with such spring woodland herbs as Sanguinaria, Hepatica, Polymnia, (in Florida this is P. laevigata) Aquilegia, Sedum (in Alabama this may be S. nevii), Arenaria lanuginosa, Euphorbia commutata, various sessile-flowered Trillium, etc. The sites, being thin soils over limrock and often very rocky, produce some, but not much quality, oak, hickory, juniper. They are definitely unsuitable for plantation forestry or for mechanical site preparation methods. Since the Rudbeckia is on thin soils or on and around rock outcrops and in clearings where there is often a good exposure of mineral earth it would follow that admitting more light through removal of timber and competing understory woody growth would not harm, and probably would promote an increase of, this plant (frequently it escapes to road shoulders where the road building exposes calcareous ground!).

#### References

- Beadle, C.D. 1898. Notes on the botany of the southeastern states. Bot. Gaz. 25: 276-280.
- Perdue, R.E. 1957. Synopsis of Rudbeckia subgenus Rudbeckia. Rhodora 59 (708): 294-299.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1422-1427. Chapel Hill, N.C.
- Torrey, J. and A. Gray. 1842. Rudbeckia in North American Flora 2: 308.



SPECIES Rudbeckia triloba L. var. pinnatiloba T. & G.  
Pinnate-lobed black-eyed susan

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments: This plant locally is as much of a weed as the common variety!

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Rudbeckia triloba L. var. pinnatifida T. & G.



ASTERACEAE

Senecio millefolium T. & G. Piedmont ragwort  
S. memmingeri Britt.

Technical Description

Solitary or caespitose, rosulate and caulescent perennial, from a stout caudex, increasing by ascending, short-rhizomatous, offshoots.

Stems.-- Ascending to erect, fistulose, mostly 5-8 dm high, proximally and on the nodes white-wooly-hairy, strongly ribbed, often sulcate, branching from the middle or above, the slender branches arching upward, terminating in inflorescence branchlets.

Leaves.-- Rosette leaves numerous, spreading to erect, these and the lower stem leaves crowded, mostly 1-3 dm long, strongly petiolate, the slender petiole bases abruptly and broadly clasping, the blades smooth, mostly oblong or cuneate or narrowly obovoid, 1-3 cm long, divided into few to many, short-to-elongate-linear segments, in all giving a "parsley" aspect to the foliage; stem leaves alternate, becoming more scattered, shorter, more sessile, and generally less dissected upward on stem, grading into scattered, short-linear-triangular bracteal leaves in the inflorescence.

Inflorescence.-- A single or compound system of cymes, the primary and lower branches upcurved, variously elongate, the ultimate, crowded peduncles of various lengths but usually much longer than heads, very slender, smooth, each branchlet subtended by a short-linear-triangular villosulous bract and with few to many bractlets, some usually directly subtending the head; heads campanulate, ca. 1 cm high, the receptacle shallowly convex, chaffless; phyllaries usually in 2 series, the outer irregular, of a very few short, linear-triangular, erect or incurved bractlets mostly 1 mm long or less, or these lacking, the inner series of very many narrowly linear-triangular, subequal, thin, green phyllaries, these ca. 5-8 mm long, fused below the middle into a cup, their suberect tips triangular, acute, with broad, pale, scarious margins.

Flowers.-- Of two sorts, ray and disc, the former pistillate, the latter perfect; ray florets ca. 10, the ligules spreading, 5-9 mm long, linear-elliptic, bright yellow, apically 3-5-toothed; disc florets with corolla ca. 4 mm high, erect, deeper yellow, the slender tube broadening into a narrowly campanulate throat, the 5 erect to spreading lobes short-triangular.

Fruit.-- Akenes linear-ellipsoidal, ca. 2.5 mm long, 5-ribbed, the ribs strongly raised, densely short-hairy with pale hairs, the intervals pale to dark brown; pappus white, of very many distinct, capillary bristles.

Distribution and Flowering Season

Open to lightly shaded granitic outcrops, Blue Ridge and inner Piedmont, North Carolina southward into northeastern Georgia and northwestern South Carolina. Flowering in May.



### Special Identifying Features

S. millefolium is taxonomically closest to S. anonymus Wood (S. smallii Britt.) and intergrades with it in some localities. The only real difference between the two appears to be the much more dissected foliage of the former. Intergrades, or somewhat more dissected-leaved S. anonymus may account for S. memmingeri and a range of S. millefolium extended to northeastern Alabama by some authors. However, the real S. millefolium, whatever its true biological status, appears to be found only in the Blue Ridge and upper Piedmont of three states.

### Habitat and Management Implications

S. millefolium grows on thin soils over granitic rock, usually on and around outcrops. Usually it is in full sun on steep granite domes or ledges, in shallow depressions or cracks therein, but occasionally may be found in light shade of an oak-hickory-pine-juniper overstory. The soil is prevalently sandy, acid and poor, and some associated herbaceous plants are in genera Danthonia, Panicum, Aristida, Bulbostylis, Carex (such as C. nigromarginata, C. physorhyncha), Arenaria, Sedum, Thermopsis, Baptisia, various dry site Solidago, Aster, Coreopsis. Elevations range from 2,000 ft. to 4,000 ft. In the vicinity of Caesar's Head, S.C. are seen several small populations, many in the process of being shaded out by encroaching woody vegetation, evidence that this plant occupies a niche below climax. It is endangered over its small range primarily by development of the rocky and scenic land for vacation or retirement housing.

### References

- Barkley, T.M. 1978. Senecio in North American Flora, Ser. II (10): 50-139. New York Botanical Garden.
- Radford, A.E., C.R. Bell and H. Ahles. 1968. Manual of the vascular flora of the Carolinas, pp. 1034-1037. Chapel Hill, N.C.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1478-1480. Chapel Hill, N.C.
- Torrey, John and Asa Gray. 1843. Flora of North America 2: 444.

SPECIES Senecio millefolium T. & G. Piedmont ragwort

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Senecio millefolium T. & G.





ASTERACEAE

Silphium brachiatum Gattinger. Cumberland rosinweed

Technical Description

Perennial, fully to 2 meters tall, fleshy-rooted, from a stout, nearly erect, fleshy caudex.

Stems: Erect, usually solitary, up from an overwintering rosette of large leaves, 1-2 cm. thick at base, smooth, terete, pale green, glaucous (with a bloom), slightly ribbed, sparingly branched or simple.

Leaves: Stem leaves opposite, spreading-ascending, the largest lowest, mostly on rigid, ciliate-margined petioles 5-8 cm. long, the blades triangular-ovate, 15-30 cm. long, coarse, narrowly acute or acuminate, the margins coarsely and saliently toothed, particularly toward the base, the base truncate or shallowly cordate (sometimes hastate), thus abruptly narrowed to the petiole; the upper surface dark yellow-green, harsh, lower surface paler, harsh; leaves upwardly gradually reduced in size, shorter-petioled, becoming entire and grading into scattered, lanceolate inflorescence bracts.

Inflorescence: Heads several to many, in an open, broad upwardly arching-branched cyme, the branches slender but stiffish, smooth, the heads themselves in fruit hemispheric, about 1.5 cm. high and 3 cm. broad across phyllary tips. Involucral bracts numerous, loosely overlapping, the largest median, ovate to broadly lanceolate or oblong, acute, about 1.5 cm. long, firm, spreading or erect, harshly ciliate, the backs green, smooth.

Flowers: Rays fertile, the ray corollas spreading, the ligules 1.0-1.5 cm. long, elliptic, pale yellow. Disc florets with corollas yellow, tubular with strong ribs and low-triangular bristly-hairy lobes, sterile.

Fruit: The akenes strongly flattened parallel to head center, broadly obovate to suborbicular, 5-7 mm. long, narrowly margined, with 2, low-triangular teeth at apical notch. Chaff longer than akenes, firm-cartilaginous-based, with acute to rounded, greenish, scabrid, eglandular tips.

Distribution and Flowering Season

Calcareous rocky clearings, Cumberland escarpment as it borders the eastern Highland Rim, Kentucky and Tennessee; northern Alabama. Flowering July into August.

Special Identifying Features

The rosinweeds are one of the most difficult genera in the Southeastern Area, attempted by many but as yet not conducive to a complete treatment. However, this is one of the few distinct species, combining (1.) a large stature with smooth, glaucous stems, (2.) large, coarsely toothed stalked leaves with ovate-triangular blades coarsely large-toothed and cordate or truncate based, (3.) and heads with phyllary backs smooth, akenes with narrow wings and shallow apical sinuses.

### Habitats and Management Implication

S. brachiatum is found in clearings, usually on sticky soil over limestones, usually rocky, in mixed hardwoodlands or in very open stands of hardwood, these admixed with Juniperus. It may be associated with plants of prairies or limestone glades such as Echinacea, Ratibida pinnata, various sunflowers, Andropogon gerardi, A. scoparius, Sorghastrum. Such habitats may be quite dry seasonally. Surrounding forest may be oak-hickory (with an infusion of Pinus echinata, P. taeda) enriched with Aesculus glabra, Tilia, Ulmus, Celtis, Robinia, Fraxinus (americana). The forest, though a limerocky woodland, produces trees of merchantable size and much of it shows effects of heavy logging.

In that this is a species of clearings, timber cutting has probably not affected it much, though grazing reduces it. Fire, not recommended as a management tool but nonetheless occurring, probably has no adverse effect on this species. The very rocky nature of the habitat precludes any mechanical site preparation methods so little can be stated as to the impact these might have on S. brachiatum.

### References

- Fernald, M. L. 1950. Gray's Manual of Botany, ed. 8: pp-1475-1477.  
Gleason, H. A. and A. Cronquist. 1963. Manual of vascular plants of north-eastern United States and adjacent L. Canada, pp. 689-690.  
Perry, Lily M. 1937. Notes on Silphium. Rhodora 39: 281-297.

Note--Since this paper was first published, doubt has been placed on records of this species from Kentucky !

Revised March 1980

SPECIES: #71 Silphium brachiatum Gattinger. Cumberland rosinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage		NA				X		X
No Lasting Effect								
Beneficial if Done Properly	X				X			

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



*Silphium brachiatum* Gattinger



ASTERACEAE

Silphium confertifolium Small. Southern rosinweed,  
rosinweed

Technical Description

Coarse smoothish perennial from a stout erect caudex or with knotty, ascending rhizome, the roots thick.

Stems.--Usually solitary from overwintering rosettes, to 7 dm tall, but usually lower, erect, unbranched save in inflorescence, terete but fluted, greenish with tints of red or maroon.

Leaves.--Stem leaves concentrated toward the base and there largest, blades broadly lanceolate or ovate, variable in length, from 7-20 cm long, acute, entire, ciliate-scabrid, the bases from broadly rounded to broadly cuneate, thence abruptly attenuated down the petiole which is no more than 1/3 the blade length: upper leaf surface smooth or with distant short sharp hairs, dark green; lower surface paler, veiny, sometimes with a scattering of hairs along the prominent midrib; leaves above the stem base sharply reduced in size and on more elongate internodes, erect, opposite sessile or short-petiolate, more often elliptic or lanceolate, grading into distant pairs of small ovate bracts.

Inflorescence.--Of few to many heads in a more or less open or congested cyme on peduncles much longer than themselves, the inflorescence branches stiffly ascending from the upper stem nodes. Heads broadly campanulate, across the bracts ca. 1 cm high and to 1.5 cm broad, the several firm bracts overlapping loosely spirally, mostly ovate, the greenish tips often spreading apically, acute to obtuse, the margins stiffly ciliate; involucre bracts grading gradually to narrower (mostly oblong) pales (chaff) whose tips are purplish, with a strigillose whitish pubescence.

Flowers.--Ray florets 8-10, fertile, the ligules spreading, oblong-linear, ca. 1.5 cm long, lemon yellow; disc florets on a slightly elevated receptacle, mostly sterile, the corollas tubular with ascending, broadly triangular lobes, greenish-yellow.

Fruit.--Akene broadly obovate, flattened, ca. 6-7 mm long laterally winged with wings 1 mm. or less broad, these terminating in 2 low-triangular teeth at sides of akene summit; akene body appressed white-hairy on its inner concave face, otherwise smooth, gray-brown when ripe.

Distribution and Flowering Season

Prairies and glades over chalk, Black Belt Alabama; flowering July into early September.

Special Identifying Features

This species is closest taxonomically to extremes of Silphium trifoliatum L. var. latifolium Gray, and both may occur in the same area, the latter distinguished by its lower habit, smaller leaves, and especially by its tendency to have the leaves more crowded toward the base with the mid and upper stem leaves abruptly reduced in size. It should probably be treated as an extreme or at best as a subspecies of S. trifoliatum, yet for the reasons stated above is quite distinctive in the

field. So far it has been found only in Choctaw, St. Clair, and Sumpter counties in Alabama.

#### Habitats and Management Implication

S. confertifolium appears to be calciphilic, being thus far found only on the heavy black clay earths that weather from calcareous rock. These soils, with their very fine texture, tend to be very wet and sticky during the rainy periods, bake to brick-like character during dry periods. This silphium is usually in association with prairie plants including a large array of grasses, sedges, composites, umbellifers in areas that once were probably fire maintained and thus could be termed savanna-prairie. Oak species such as Q. shumardii, Q. phellos, Q. nigra, Q. durandi, Q. stellata, hickory such as Carya ovata, C. carolinae-septentrionalis, C. myristicaeformis, elm, osage-orange, hercules club, green and white ash, and juniper typify the forest. The region this plant grows in is dotted with outcrops of limestone, particularly chalk, these unsuited for any row crops and S. confertifolium will grow in shallow soils that accumulate in and around such outcrops. It may have ranged into the deeper soils further from outcrops but such have largely been converted to row crops or to improved pasture grasses, these last tending to close out the original growth of forbs and grasses. S. confertifolium and other such plants thus are on the border of extinction. Outcrops where these may yet be found are mostly heavily grazed, and their poor quality pasture is mostly eaten to the ground by poor quality cattle or goats. In areas where both cattle and fire are excluded, trees are coming back in, particularly Juniper, and such forbs are being closed out.

#### References

- Perry, Lily M. 1937. Notes on Silphium, Contr. Gray Herb. CXVII: pp. 281-296.
- Small, J. K. 1933. Manual of the southeastern Flora, pp. 1408-1415. Chapel Hill, N.C.



SPECIES: #7 Silphium confertifolium Small, Rosinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								X
No Lasting Effect								
Beneficial if Done Properly	but NA				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Silphium confertifolium Small



ASTERACEAE

Silphium integrifolium Michx. var. gattingeri Perry.  
~~Entire-leaved~~ rosinweed

Technical Description

Thick-rooted perennial from a stout erect rhizome (caudex).

Stems: Mostly erect, mostly between 1 and 2 meters tall, terete, slightly fluted, smoothish, pale green with tints of brown or brownish toward base, sometimes slightly glaucous.

Leaves: Mostly opposite, the blades lanceolate to ovate, the lowest largest, mostly 10-20 cm. long, very firm, sessile above, short-petiolate toward stem base, acute, the margins scabrid, also entire, denticulate or finely to coarsely serrate, the upper surface smooth to scabrid, the lower surface paler, smooth to scabrid.

Inflorescence: Heads usually numerous, in diffuse to compact cymes, the branches spreading-ascending, stiffish. Fruiting involucre broadly cup-shaped, 1.0-1.5 cm. high, 2.0-3.0 cm. broad; phyllaries rather loose, often spreading, mostly elliptic or broadly to narrowly obovate, multi-ribbed, greenish, rounded, the margins stiffly ciliate, the backs smooth; pales (chaff) if outermost similar to inner bracts, progressively narrower toward head center, all strongly upwardly ciliate-margined.

Flowers: Ray florets fertile with blades narrowly oblong or linear, 3.0-3.5 cm. long, bright yellow. Disc florets sterile, the tubular corollas strongly nerved, with short-triangular, bristly-hairy, yellow lobes.

Fruit: Akene broadly obovoid, fully 1 cm. long, flattened parallel to head axis, broadly winged (wing between 1 and 2 mm. wide), this notched 2-4 mm. deep at akene apex and there produced laterally into 2, triangular-acuminate, even subulate, tips, the margins entire or sparsely ciliated apically, the backs smooth or with a scattering of short hairs apically.

Distribution and Flowering Season

Rocky, usually calcareous, clearings, middle Tennessee; flowering July into September.

Special Identifying Features

Perry (1937) described this variety from a single specimen (Tennessee, Davidson County: Charlotte Pike, Nashville, July, 1886, Gattinger) which this writer has not seen. However, other plants fitting the rather brief description are to be found in counties of middle Tennessee. There does exist some doubt as to the distinctness of this variety, at least as to its position in the genus. S. integrifolium is supposed to be distinguished by its being part of a complex which has leaves not connate-perfoliate, by its leafy bracted involucre, by



its unlobed stem leaves which are sessile or short-petiolate, and by its broadish akene wings. While most S. integrifolium has involucre bracts that are mainly scabrous pubescent, this has glabrous bracts and the wing-tips of the akenes are drawn out into narrow stiff tips. Unfortunately for this taxonomy, S. trifoliatum var. latifolium is supposed to be part of another complex on the basis of its narrower akene wings, yet has examples which have wing widths overlapping that of S. integrifolium, and otherwise has characteristics that could include S. integrifolium var. gattingeri. Thus, this should be included here only as a doubtful taxon whose characteristics are shared by at least two species.

#### Habitats and Management Implication

This plant frequents the rather heavy, seasonally dry, clays derived from underlying limestones of middle Tennessee. It is usually in limerock clearings amidst oaks such as Quercus stellata, Q. shumardii, Q. muhlenbergii, Q. imbricaria, etc., hickories such as Carya ovata, C. caroliniae-septentrionalis, C. ovalis, and a scattering of juniper, white ash, blue ash, September elm, American elm, slippery elm, Forestiera ligustrina, Rhus spp. and Rhamnus caroliniana. In the clearings it is usually in grasses such as Andropogon spp., Panicum virgatum, Sorghastrum, Sporobolus and with forbs such as other composites, Petalostemon, several Lespedeza and Desmodium, Sabatia angularis, Lobelia spicata, etc.

Single tree or group selection might be recommended for the surrounding forest, in any event probably favoring increase of this species in clearings. There is some history of fire in the area, this again favoring increase. Grazing tends to reduce it except along fencerows.

#### Reference

Perry, Lily M. 1937. Notes on Silphium. Rhodora 39: 281-297.

Revised March 1980

#39 Silphium integrifolium Michx. var. gattereri Perry.  
 SPECIES: Entire-leaved rosinweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	?				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Silphium integrifolium Michx. var. gattingeri Perry





ASTERACEAE

Solidago albopilosa E. L. Braun. white-haired goldenrod

Technical Description

Perennial from a short, sometimes thickened caudex.

Stems: The stems mostly 3-10 dm. long, solitary or several from ascending rhizomes, erect, ascending or laxly spreading, soft, terete and low-ribbed, white-pubescent with abundant cottony hairs.

Leaves: Alternate, all petiolate, those of the lower stem and rosettes largest (lowermost stem leaves usually absent by flowering time), the largest mostly 6-10 cm. long, with petioles fully half the total length, the blades broadly elliptic or ovate, acute or acuminate, coarsely serrate, the bases abruptly narrowed to the petiole, thence attenuated along it to near its middle or below, the texture thin and soft, the upper surface dark green with soft, appressed hairs, the lower surface paler with soft, appressed hairs, and strongly soft pilose along the veins. Leaves gradually reduced in size upward, those from about mid-stem upward often developing short or fairly elongate, ascending or spreading branches or racemes.

Inflorescence: Heads in flower mostly 4-6 mm. high, turbinate, on slender, soft-pilose peduncles 3-5 mm. long, these with numerous short-oblong, green, ciliate bracts that grade into the bracts of the heads. Involucral bracts several, in several series, loosely imbricate, the outermost shortest, the larger ones 3-4 mm. long, oblong, acute, thinnish, the midpart green with a paler midrib plus some indistinct lateral nerves, the apex thin, acute or rounded, ciliate, the margins broad, pale, very thin.

Flowers: Ray florets mostly (3-)4-8, the spreading oblong-linear rays about 5 mm. long, bright yellow. Disc florets 15-+ the corollas yellow, about 3 mm. long, the narrow tube flaring into a narrowly campanulate throat and short-spreading, triangular toothed limb.

Fruit: Akene narrowly oblong, pale brown, strongly silvery pilose with hairs ascending; pappus fine, white, nearly as long as the disc corollas.

Distribution and Flowering Season

Sandy rockhouses in the Red River country of the Cumberlands of Kentucky; flowering mostly in September.

Special Identifying Features

Original and subsequent descriptions indicate that the most distinguishing character of this species is its pubescence, otherwise it is rather similar to S. flexicaulis, but does differ also in its much thinner leaves and an even softer lax habit. According to Andreasen (1970) these plants have few, if any, chromosome abnormalities in most individuals or populations.

#### Habitats and Management Implication

S. albopilosa is found associated with Heuchera parviflora, Campanula divaricata, and Silene rotundifolia (other common rock-house species) in sites under projecting cliffs and roofs of rock-houses. There, as Braun (1942) noted, it may be abundant enough to carpet the sandy ground but it stops along a line even with the cliff edges above. It is a plant of at least partial shade therefore, in what would be described as a mixed-mesophytic forest involving an overstory of mixed oak, Hard Maple, Red Maple, Nyssa, Aesculus, with an understory of various deciduous magnolia species, Flowering Dogwood, Rhododendron maximum and Kalmia. The soil is nearly a pure sand derived from sandstone of the Pottsville Formation.

The topography is steep and quite erodable. While the plants occur in comparatively protected places such as in the shadows and crevices of rockhouse overhangs and ledges, intensive logging of contiguous mesophytic forest could impact the sites through increasing light and thus drying, or through increasing susceptibility to erosion. Another factor accompanying such logging would of course be the subsequent increase of undesirable woody weeds such as Rubus, Smilax, Lonicera, as well as the troublesome Pueraria.

#### References

- Andreasen, M. L. 1970. Solidago albopilosa Braun, Species and Population dynamics. M. S. Thesis, Miami University.
- Braun, E. L. 1942. A new species and a new variety of Solidago from Kentucky. Rhodora 44 (517):1-4.
- Fernald, M. L. 1950. Gray's Manual of Botany. 8th Ed.: 1381-1413.

SPECIES: #125 Solidago albopilosa E. L. Braun. White-haired goldenrod

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy	X					X		X
Damage					X			
No Lasting Effect				NA			NA	
Beneficial if Done Properly								

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980



Solidago albopilosa E. L. Braun



ASTERACEAE

Solidago pulchra Small

Status: Endangered

Technical Description:

Rather delicate, smooth, wand-like goldenrod perennating by short lateral rosulate offshoots from a short, erect caudex.

Stems: usually one/rosette, erect, slender (toward base ca. 2 mm thick), 3-10 dm high, terete, strongly rounded-ribbed, strongly tinged with red or purple, the nodes numerous.

Leaves: alternate, plants leafy throughout, the largest stem leaves lowermost, the rosette strong and its leaves largest of all, spreading, 4-8 cm long, the petioles 1/2 or slightly more of the total length, the blades narrowly elliptic to oblanceolate, firm, acute, the entire margin somewhat thickened, reddish, the base attenuated, the surface yellow-green, only the midrib evident; stem leaves at plant base somewhat smaller than rosette leaves but similar, then grading abruptly to numerous, erect, much smaller and sessile ones, these oblanceolate to narrowly elliptic-oblong or short-linear, and which by midstem are often 1 cm long or shorter and at inflorescence base rarely 3-4 mm long.

Inflorescence: Heads few (3-15), in a short, rather narrow, sometimes crook-tipped inflorescence, evenly disposed or unilateral, the peduncles erect or ascending, shortish (from shorter than heads to ca. 7 mm long), slender, angulately ribbed, sparingly to several-bracteolate. Flowering heads ca. 0.5 cm from base to tip of florets, broadly campanulate or turbinate, the phyllaries several, loosely imbricated in few series, thin, yellowish, the largest ca. 3 mm long, apically obtuseangled or narrowly rounded, marginally ciliolate, otherwise smooth, the midrib only evident, this a raised yellowish-resinous band; outermost phyllaries short-linear, sometimes keeled; receptacle flat, chaffless.

Flowers: Rays about 5, the ligules a bright, pale yellow, spreading obovate, 3.0-3.5 mm long, the flowers female, non-functional; disc florets 20-25, the corollas ca. 5 mm long, a deeper yellow, the short tube dilating, narrowly funnelform into the throat, the limb spreading or ascending, of 5, triangular lobes ca. 1 mm long, the style branches lanceolate, acute, externally papillose.

Fruit: Akene columnar, faintly longitudinally ribbed, ca. 1.5 mm long, pale brown, hirtellous, the pappus of white, rigid, capillary bristles reaching about the level of the disc corolla limb.

Distribution and Flowering Season:

Moist sandy peat of flatwoods savanna and pocosin borders, Coastal Plain, two counties in eastern North Carolina; flowering from September to frost.

Special Identifying Features:

My own experience with this seemingly rare plant has been but one sighting, this in Onslow County, N.C. in fall of 1964. My

reaction then was to identify the plants as rather depauperate S. stricta Ait., with which this species is unquestionably allied. The differences appear to be few, namely that S. pulchra is consistently smaller, lower, more slender than most S. stricta. It produces a short caudex below its rosette as does S. stricta, but has no slender rhizomes as does S. stricta. The heads/inflorescence are few compared to S. stricta, (3-15 versus 20 or more). Dr. R.K. Godfrey, a long time and field-experienced student of Asteraceae, tells me (pers. comm. 1980) that this kind of morphology shows up through the habitat and range of S. stricta in northern Florida. Such forms should be investigated to clarify the real geographical and taxonomic limits of S. pulchra.

#### Habitat and Management Implication:

S. pulchra, as presently understood, is found in moist savanna in eastern North Carolina. My own collection appears to have been the most recent one made, and the habitat information therefore is confined to what was true for that locality. This one area was grass-sedge dominated savanna. The overstory was a dotting of Pinus serotina and P. palustris with some Nyssa biflora and Taxodium ascendens in the lower spots. The shrub growth around the grass-sedge openings was made up mostly of heaths in genera Vaccinium, Zenobia, Leucothoe, Lyonia, Rhododendron, Gaylussacia, Kalmia angustifolia, with Clethra, Ilex glabra, I. coriacea, Myrica, Aronia, Arundinaria, interspersed with taller but shrubby growths of Cyrilla, Gordonia, Magnolia virginiana, Rhus vernix and Persea. The soil in such places is a moist, (seasonally quite wet) black sandy peat, the openings where this goldenrod was were fire-created. Among herbaceous associates were Rhynchospora (many species, including R. pallida), Dichromena latifolia, Fimbristylis puberula, F. autumnalis, Psilocarya, Scleria, Eleocharis, Xyris, Eriocaulon, Lachnocaulon, Juncus, Pilea tenuifolia, Lycopodium, Osmunda, Sarracenia, Dionaea, Drosera, Polygala lutea, P. cymosa, Rhexia, Ludwigia, various composites including Liatris spicata, Carphephorus, Bigelowia, Marshallia graminifolia, Helianthus, etc. Common Solidago in the area were S. fistulosa, S. rugosa, S. stricta.

Much of this savanna-bog habitat has now been converted to plantation pineland or to row crop agriculture. Both involve ditch drainage and radical soil disturbance. In the case of mechanical site preparation, plants such as the Solidago may persist for a time in the drier habitat but disappear as the pine establishes.

#### References:

- Cronquist, Arthur. 1980. Vascular flora of the southeastern United States, Vol. I. Asteraceae: pp. 116-133.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1344-1360



SPECIES: Solidago pulchra Small

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage No Lasting Effect			X					X
Beneficial if Done Properly	X				X	X		

Other Comments:      Drainage destroys the habitat!

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Solidago pulchra Small



ASTERACEAE

Solidago shortii T. & G. Short's goldenrod

Technical Description

Perennial from a thickened caudex arising from ascending rhizomes.

Stems: Either erect (if solitary) or ascending with decumbent bases and forming clumps, up to 1.5 meters tall, usually 1 meter or less, yellowish-green or tinged with tan, terete but longitudinally grooved, minutely scabrid-puberulent from at least the middle up, the hairs appressed and pointing upward.

Leaves: Lower leaves absent by flowering time, of those present the lowest smaller than those of about mid-stem, these elliptic-linear, rarely oblanceolate, mostly 5-10 cm. long, rather close-set, ascending or erect, firm, acute and hard-mucronate, the margins distantly low-serrate, the bases attenuate and sessile, the surfaces smooth, yellow-green, strongly 3-nerved. Leaves progressively shortening upward into the inflorescence, becoming elliptic, bracteal, 1 cm. long or less.

Inflorescence: Heads short-stalked unilateral along the inflorescence branches (secund), the whole inflorescence nodding-tipped with the larger branches having recurved tips. Stalks of heads puberulent, mostly less than 5 mm. long, with short-linear, overlapping bracts. Involucres in flower narrowly campanulate, 4-5 mm. high (including pappus), about 3 mm. across, the phyllaries (bracts) several, spirally loosely imbricate, the shortest outermost, the longest ca. 3 mm. long, oblong, acutish, ciliate, yellow-green smooth, with a darker midrib.

Flowers: Rays (3-) 4-8, the corollas elliptic-linear, with ligules around 2 mm. long, spreading, bright yellow. Disc florets about equalling rays in number, the tube short, the throat funnelform, the 5 lobes linear, spreading, about as long as the throat.

Fruit: Akenes cuneate-cylindric (somewhat broadened upwardly), about 2 mm. long, pale brown, minutely upwardly pubescent; pappus capillary, white, about 2 mm. long.

Distribution and Flowering Season

Dryish, calcareous clearings, middle Kentucky in the vicinity of Blue Licks; the Falls of the Ohio River near Louisville. Flowering in September.

Special Identifying Features

This species is in that complex of the genus including S. rugosa (incl. S. altissima L. of some authors), S. canadensis, S. radula which combine at least some stem hair with strongly triple nerved stem leaves. However, of these S. shortii is the only one with a combination of narrow, smooth leaves, scabrid puberulence, and few florets. Similar as the species is to some others, it consistently retains its combination of characteristics over its restricted range.



#### Habitats and Management Implication

The populations at and around Blue Licks are all in rather dry sites, rooted in clay over limestone and amidst limerock boulders and outcroppings. They are either in large, gladey clearings or in open woodlands made up of Post Oak, Shumard Oak, White Oak, Yellow Oak, Shingle Oak, various upland hickories, White Ash, Redbud, Cornus, mixed with a liberal scattering of Eastern Red Cedar. The clearings themselves have a mixture of grasses including Andropogon, Aristida dichotoma and A. oligantha, annual dropseeds, Panicum flexile, Isanthus, Eupatorium altissimum and various other Solidago, particularly S. nemoralis. Most of the hardwood growth is low-grade and would be considered barely marginal from a logging standpoint.

Improved woodland pasture of contiguous areas shows none of this goldenrod. Where roads pass through, the species has spread locally onto the shoulders. No indication that logging disturbance creates openings it will occupy. No remarks are possible as to its reaction to mechanical site preparation, which is probably impractical because of the rocky and thin character of the soils on these sites. The species probably has maintained historically either through occupancy of areas where soil has been eroded to expose limestones or through periodic natural fires, these in either event creating small clearings or opening the stand.

#### References

- Torrey, J. R. and A. Gray. 1838 - 1842. *Flora of North America* 2: 222.  
Small, J. K. 1933. *Manual of the southeastern Flora*: 1200.

Revised March 1980

SPECIES: #40 Solidago shortii T. & G. Short's goldenrod

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage	X							X
No Lasting Effect		NA						
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Revised March 1980

Solidago shortii T. & G.





Paper 216  
Text & Map by:  
Robert Kral

## ASTERACEAE

### Solidago spithamea Curtis    Blue Ridge goldenrod

#### Technical Description

Stocky perennial goldenrod from a stoutish, erect, or ascending rhizome, this cloaked above by the brown bases of old leaves, often 1 cm thick.

Stems.-- Solitary or in small tufts, erect or nearly so, slender but stiffish, very leafy and compact, 1-2 (-3) dm tall, terete and longitudinally striate, greenish - brown proximally, distally becoming more strongly ribbed and reddish, sparsely to moderately strigillose, or strigose-tomentose with whitish hairs, usually simple below the inflorescence.

Leaves.-- Smooth, the offshoot and basal cauline leaves the largest and longest, ascending or erect, mostly 8-15 cm long, oblanceolate or spatulate, acute, the broader portions coarsely ascending-serrate, to 3 cm wide, the bases long-attenuate, providing a wing to the clasping petiole, the upper surface deep yellow green, inconspicuously reticulate, the lower surface paler, finely but conspicuously reticulate; cauline leaves gradually reduced upward into the inflorescence, ascending to spreading, approximate, progressively more sessile.

Inflorescence.-- A compact, symmetrical, broader than long, convex, terminal grouping of stiffly ascending, leafy-bracted cymes, 3-10 cm broad; heads campanulate, at full anthesis 7-9 mm high from base to tip of florets, 6-7 mm wide across the pappus tips; receptacle slightly elevated, chaffless; phyllaries rather tightly imbricated in several series, erect, ca. 5 mm long, lance-linear, acute to acuminate, ciliolate, the bases outbowed, white chartaceous, the surface toward the tip smooth, green, the apparent venation consisting of a single strong midrib; ray florets pistillate, 8-10 (some transitional to disc), the corollas with ligules spreading clear yellow, to 3 mm long, from narrowly elliptic to broadly cuneate-obovate, apically rounded bi-or-trilobate; disc florets numerous, erect, perfect, regular, the corolla ca. 4 mm long, the tube slender, abruptly broadening to a cylindrocampulate throat and 5 triangular, spreading lobes ca. 1 mm long; style branches erect or spreading, lance-linear, flattened ventrally, well exerted beyond the corolla at anthesis.

Fruit.-- Akene columnar, 3.5-4.0 mm long, strigillose, pale brown; pappus ca. 3.5 mm long, of numerous, white, antrorsely barbellate capillary bristles.

#### Distribution and Flowering Season

Rock outcrops, ledges, balds at high elevations, Blue Ridge, North Carolina and Tennessee; flowering from late July to September.

#### Special Identifying Features

This goldenrod is distinguished from the other cymosa-corymbose southeastern species by its low stature, smoothish foliage, toothier non-clasping (in comparison with S. rigida, a tall plant essentially of prairie - savanna) stem leaves.

### Habitat and Management Implications

*S. spithamea* is indeed a rare plant, being confined to a few rocky, granitic summits in the Blue Ridge, not being known from elevations under 4,000 ft. Typically it is rooted shallowly in dark humified fine sands that accumulate in cracks or pockets on acid rock, or on bluff ledges, usually in full sun. Sometimes it is with grasses and sedges on the grass balds contiguous to rock outcrops. Common associate herbs are plants such as *Deschampsia flexuosa*, *Danthonia compressa*, *Poa* spp., many high bald *Carex*, *Potentilla tridentata*, *Prenanthes roanensis*, *Arenaria groenlandica*, *Paronychia argyrocoma*, *Hedyotis montana*, *Geum radiatum*, etc. Thus it is basically a grass bald species, in a rare and sensitive system that contains many other rare species of herbs. Two risks to it are posed. The first is natural succession, in that shrubby ericads gradually invade balds, finally suppressing most herbs, then these heaths later are overgrown by *Picea* or *Abies*. This natural succession is very slow, is comparable to that taking place on granitic rock in the boreal forest formations to the north. The second is the impact of humans on the site; high Blue Ridge balds are extremely scenic, of great interest to tourists and local recreators and thus National Forest, National and State Park, and private developers alike wish to provide road access to some of the most scenic places. This means (in the case of Grandfather Mountain, Roan Mountain, Banner Elk, etc.) development of parking, lodge, or shelter facilities at the summits and thus the habitat for the goldenrod and other rarities is reduced. Excessive trail building and road construction to overlooks have taken their toll, either through the actual construction process or by trampling later by sightseers. In that most of the known habitat for *S. spithamea* is "protected" either by public or private ownership, and in that the philosophy of all at present is away from the logging of summit forest, forest practices pose no threat to this species.

### References

- Radford, A.E., C.R. Bell and H.E. Ahles. 1968. Manual of the vascular flora of the Carolinas, pp. 1084-1098. Chapel Hill, N.C.
- Small, J.K. 1933. Manual of the southeastern flora, pp. 1344-1360. Chapel Hill, N.C.

SPECIES Solidago spithamea Curtis. Blue Ridge goldenrod

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze
Destroy		NA	NA	NA			NA	
Damage								X
No Lasting Effect	X							
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Solidago spithamea Curtis



ASTERACEAE

Solidago verna M.A. Curtis ex T. & G.

Status: Threatened

Technical Description:

Perennial goldenrod from a stout (to 1 cm thick), knotty ascending rhizome or caudex, perennating by short lateral offshoots from crown buds.

Stems: Erect or ascending, bolting from rosettes of the previous year, mostly 0.5-1.5 m high, solitary or in small clumps, stiffish and straight to somewhat flexuous, to 5 mm thick at base, terete with several low, rounded ribs, villosulous (with short, kinky hairs) with pale pubescence throughout, greenish with tints of purple, the upper 1/3 usually liberally branched, the lowest branches longest, arching upward, then outward.

Leaves: alternate, also in rosettes. Rosette leaves largest, usually more than 1/2 petiole, 1-3 dm long, the blades suborbicular to broadly elliptic, obovate or ovate, acute to rounded, the margin crenate-serrate to crenate-dentate, the base abruptly attenuate and decurrent to form a petiolar wing, the upper surface a bright yellow-green, strigillose-puberulent, the lower surface paler, villose-tomentulose, particularly along the raised main veins, the pattern pinnate-arcuate, the petioles slender but winged, stiffly spreading, erect or ascending, marked with maroon along the main ribs. Stem leaves at base similar to rosette leaves, toward mid and upper stem gradually smaller, elliptic to ovate or lanceolate, erectish, grading to short, oblong, elliptic or linear inflorescence bracts.

Inflorescence: Inflorescence branches with a scattering of small bracts, usually producing abundant heads or small cymules of heads densely in the upper 1/2, these unilateral (secund) on the upper side of the branch, the total inflorescence usually spreading to become broad as long or broader than long (rarely inflorescence with laterals more ascending or shorter, thus narrower); peduncles slender but stiffish, tomentulose, from slightly shorter than heads to 1.5 times longer; heads broadly campanulate, from base to tip of pappus ca. 5-7 mm high, the receptacle flattish, chaffless, the involucral bracts (phyllaries) many in several series, the outermost, (lowest) greenest, shortest, lance-oblong, or lance-linear, acute, grading into the few peduncular bractlets, the median and inner phyllaries 3-5 mm long, loosely imbricated, narrowly oblong, flat, thinnish and at least above the middle green on either side of a yellowish, translucent midrib (sometimes also with an indistinct lateral nerve or two), apically rounded or acute, very thin and lacerate-ciliate, the margins broad, thin, pale, ciliate, the backs smooth.

Flowers: Ray florets mostly 8-10, the ligules spreading, a pale but rich yellow, elliptic, ca. 4 mm long, the appendaged style branches present but the flower non-functional; disc florets many, the corollas 4-5 mm long, the tube and throat forming a narrow funnel, the 5 erect to spreading, bright yellow lobes narrowly triangular, 1.0-1.3 mm long, the lance-linear style branches exerted, acute,

papillose externally.

Fruit: Akene columnar, obscurely ribbed, sometimes slightly compressed, 2.0-2.5 mm long, strigillose with pale hairs; pappus about the length of the disc florets, white, simple, of numerous antrorsely barbellate capillary bristles.

#### Distribution and Flowering Season:

Sandhill-pocosin ecotones, moist rises in wet flatwoods and savannas, Coastal Plain, scattered localities in the southern half of eastern North Carolina southward into northeastern South Carolina; flowering in May and June.

#### Special Identifying Features:

S. verna firstly is distinguished by its early flowering habit, being at anthesis when most other goldenrods have not yet bolted from their rosettes, thus it is seemingly well isolated reproductively. It is part of a rather large group of species that have leaves progressively smaller from base to tip of shoot, with the lower ones persisting, and which in addition have heads arranged unilaterally along spreading, outwardly arching inflorescence branches. Were it not such a hairy plant, and flowering in spring, it would be quite similar superficially to some of the S. arguta complex. Some other species (S. nemoralis, S. ulmifolia, S. brachyphylla) combine hairy foliage with hairy fruit, but S. verna has more disc flowers (14-30 versus 3-8) than these, therefore has larger heads.

#### Habitat and Management Implication:

S. verna frequents a rather wide range of habitat within its narrow range. In the inner coastal plain of the Carolinas it is most commonly found in the ecotone between high sandy Longleaf pineland and the shrub bogs (pocosins) that fringe the depressions in or border the streams and rivers that drain, the sandhills. It is a plant of full sun or light shade, with its commonest associates being part of a grass-sedge system, all rooted in a dark sandy peat loam which is usually moist, not wet. In the eastern Coastal Plain of North Carolina it is found occasionally in pine flatwoods savanna, usually again in transitional zones around Longleaf Pine-Turkey Oak rises in titi or pocosin, but not in the wettest bog. The shrubby formations no doubt were, in nature, the main competitive factor either in the sandhills or lower Coastal Plain, and these shrubs together with the pine-hardwood overstory were reduced by frequent naturally occurring woods fires sufficient to produce the openings this plant frequents.

S. verna is being reduced by a combination of factors, one being the rapid expansion of urban and residential construction in the Coastal Plain, another the rapid conversion of savanna and pocosin to plantation pineland, still another the utilization of the black sandy peats for row crop agriculture or improved pasture, all of these involving either total habitat destruction or drainage, which ultimately achieves the same effect. Best chances for survival of this species are probably to be found in the sandhills, which are less suitable for large scale slash pine plantings or for row crop agriculture.



References:

Cronquist, Arthur. 1980. Vascular flora of the southeastern United States, Vol. I. Asteraceae. Solidago, pp. 116-133. Chapel Hill.

Small, J.K. 1933. Manual of the southeastern flora, Solidago, pp. 1344-1360.

SPECIES: Solidago verna M.A. Curtis ex T. & G.

Expected* Effect on Habitat	Prescribe Burn	Doze or Root Rake	Bed	Chop	Thin Over- story	Cut Over- Story	Over Plant with trees	Graze
Destroy		X		X			X	
Damage			X					X
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Estimated effect is an estimate of the author based on his book knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may vary in degree of application, intensity, nearness to plant communities, etc. A column left "blank" indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, predictions should be refined by area and by intensity of forestry practices.

Approximate Known Range of:  
Solidago verna M.A. Curtis ex T. & G.





ASTERACEAE

Verbesina chapmanii J.R. Coleman. Chapman's crownbeard,  
crownbeard

Technical Description

Robust, bushy perennial from a thick, knotty caudex with fleshy roots.

Stems.--Usually numerous, stiff, erect or ascending, simple or sparingly branched, round but many-ribbed, minutely roughened.

Leaves.--Erect, opposite or nearly so, sessile or nearly so, firm, lanceolate to oblong, elliptic or rarely oblanceolate, the largest from 6-10 cm long, 1.5-2.5 cm broad, the tips rounded to blunt-acute, the margins low-serrate to entire, the bases acute, cuneate or rounded, the surfaces scabrous. Lowest leaves smallest, mostly oblanceolate or spatulate, the pairs well separated, grading up the stem to the largest at mid-stem, then smaller into the inflorescence.

Inflorescence.--Heads solitary at tips of long peduncles, or few and stalked in a terminal cyme or, rarely, the plant also producing long-stalked cymes from upper leaf axils and the inflorescence fuller. Heads short-conic, 1.5-2.0 cm broad across the base, the bracts numerous, imbricated in 2-3 series, the largest about 7 mm long, oblong or narrowly elliptic or oblanceolate, acute or short-acuminate, entire, the backs many-ribbed, scabrous, greenish or (more often) maroon-tinted. Phyllaries grading into reddish-brown chaff of about the same length but narrower tipped, each chaff-scale embracing a floret.

Flowers.--All discoid, numerous, the corollas about 7 mm long, yellow with narrow tubular bases and narrowly campanulate limbs, the lobes triangular and erect, the surfaces scattered-puberulent.

Fruit.--Akene somewhat flattened so that one edge fits into the fold of subtending chaff, to 7 or 8 mm long, oblong or narrowly obovate, the greenish seed cavity with strong, broad lateral wings, the apex truncate and lacking pappus.

Distribution and Flowering Season

Moist pine flatwoods savannas, northwest Florida. Flowering in June, July and intermittently through summer.

Habitats and Management Implication

This species is confined to high hydroperiod, black, sandy-peaty, savanna soils, usually in open stands of slash or longleaf pine, grass-sedge formations where wiregrass often dominates, and at the edges of boggy sites. It is most abundant where there have been recent fires sufficient to remove competition from the shrub (particularly palmetto and gallberry) understory and the more vigorous grasses (particularly Aristida). Areas within its former range that have been drained, row-planted to slash pine, and protected from fire are without this species.

References

Chapman, A. W. 1860 Flora of the southern U.S. P. 255. Cambridge, Mass.

Coleman, James R. 1972 Nomenclatural Clarification of two species of Verbesina (Compositae) endemic to Florida. Rhodora 74 (797): 97-101.

Small, J. K. 1933. Manual of the Southeastern Flora. pp. 1443-1444. Chapel Hill, N.C.

SPECIES: #72 Verbesina chapmanii J. R. Coleman, Crownbeard

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected affect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Verbesina chapmanii J.R.Coleman





Paper 73  
Text & map by:  
Robert Kral

#### ASTERACEAE

Verbesina heterophylla (Chapm.) A. Gray. Variable-leave  
crownbeard; crownbeard  
Actinomeris heterophylla Chapm.  
Verbesina warei A. Gray

#### Distribution and Flowering Season

V. heterophylla is in similar habitats to V. chapmanii (which see!) but is confined to the flatwoods of eastern peninsular Florida and usually on somewhat drier sites. It also flowers mostly in early summer.

#### Special Identifying Features

Similar to V. chapmanii in rootstock and habit, differing in the following ways: Stems more scabrous, strongly winged between nodes. Leaves sessile, often decurrent (blade margins merging with stem wings), mostly broadly elliptic or obovate, the tips acute to rounded, the margins coarsely serrate or dentate, the bases cuneate, the surfaces very harsh. Heads more numerous, usually single on numerous, upwardly arching, elongate stiffish stalks, narrower, between 1 and 1.5 cm broad, the phyllaries (bracts) narrower-tipped, acuminate. Ray florets present, spreading, yellowish. Akene shorter, ca. 5 mm. long, with a broader outline.

#### Habitats and Management Implication

The plants are to be looked for on sandy peat in fire-maintained savannas or in open stands of slash pine-palmetto where wiregrass dominates. Problems in management would be essentially the same as those for V. Chapmanii, (which see).

#### References

- Chapman, A. W. 1860. Flora of the Southern U. S. pp. 255.  
Coleman, J. R. 1972. Nomenclatural clarification of two species of Verbesina (Compositae) endemic to Florida. Rhodora 74 (797):97-101.  
Small, J. K. 1933. Manual of the southeastern flora, Pp.1443-1444. Chapel Hill, N.C.

SPECIES: #73 Verbesina heterophylla (Chapm.) A. Gray. Crownbeard

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X		X			X	X
Damage			X					
No Lasting Effect								
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Verbesina heterophylla Chapm. ex Gray





ASTERACEAE

Vernonia pulchella Small, Georgia ironweed; ironweed

Technical Description

Perennial herb, rather coarse, but usually 1 meter tall or less.

Stems.--One to several from a short, stout, thick-rooted caudex, slender but stiffish, not branching below the inflorescence, round in cross section, also fluted with several ribs, variable in pubescence from nearly smooth to villous, appressed-puberulent or scatteringly hirsute or with a mixture of these hairs, strongly maroon or purple-tinted.

Leaves.--Stiffly erect or spreading, numerous, alternate, lanceolate to oblong, elliptic or obovate, the lowest smallest and distant, the largest at or just below mid-stem, mostly 3-6 cm long, the tips acute or obtuse angled, the margins revolute, entire or coarsely serrate, the base sessile or on a short stout petiole, auriculate, the upper surface dark green, the lower paler, both surfaces scabrous.

Inflorescence.--Several to numerous-headed, an open broad cyme of cymes, the main branches ascending from the axils of reduced stem leaves and stiffish, the peduncles erect or spreading, usually fine-hairy and longer than the heads or sessile. Heads campanulate, from base to tip of phyllaries ca. 1 cm and nearly as broad, the phyllaries (bracts) numerous, imbricate in several spirals, narrowly triangular to narrowly ovate, the outer ones smallest, loosest, and narrowest, the longer ones ca. 7 mm long, the tips slender acuminate, recurved, giving a "bristly" look to the heads, the surfaces green with maroon or purple tints, cobwebby ciliate-hairy marginally and sometimes on the backs.

Flowers.--All discoid, all fertile, 20-36 on an elevated, naked receptacle, the purple corollas projecting ca. 5 mm beyond the bracts, about 1 cm long with a long tube, narrowly funnelform throat and 5 narrowly triangular, spreading lobes.

Fruit.--Ripe akenes about 3 mm long, oblong, strongly many-ribbed and bristly along the ribs, yellowish-green with flecks of purple, the pappus of many capillary stiff barbellate bristles ca. 8 mm long, these sordid or dull-brown.

Distribution and Flowering Season

Pine-saw palmetto flatwoods, southeastern Georgia, late July to early September.

Habitat and Management Implication

This distinctive ironweed is not rare within its rather small range, though it is nowhere aspect dominant. Its soils range from rather dry to quite moist, but are usually those of low rises in flatwoods or of edges of seep areas in longleaf pine forested ridges. It is a plant either of full sun, or is found in savannas or in the intermittent shade of tall and scattered pines. It is best developed in areas that have been burned recently, where it may be locally abundant together with a myriad of other summer flowering composites, grasses and sedges, etc. It will

appear in clearings amongst palmetto, gallberry, wax-myrtle, and various ericaceous shrubs particularly Lyonia, Vaccinium, Gaylussacia. As is true of cormophytes it holds up well even under hot fires, putting up new shoots rapidly and producing heavy crops of flowers and fruit in the burns. It will persist in drained areas but is shaded out in young plantations. It will occupy areas that have been subjected to nearly all methods of site preparation, so long as a contiguous seed source is available, but the shade of well stocked pine plantations eliminates it and most other savanna forbs. As is true of many ironweeds the species can survive moderate grazing activity.

#### References

- Gleason, H. A. 1906. *Vernonieae*, North American Flora 33: 52-95.
- Jones, S. B. 1964. Taxonomy of the narrow-leaved Vernonia of the Southeastern United States, *Rhodora* 66 (768): 382-401.

SPECIES: #8 Vernonia pulchella Small, Ironweed

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy		X	X	X			X	
Damage								
No Lasting Effect								X
Beneficial if Done Properly	X				X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.



Vernonia pulchella Small



ASTERA\*EAE

Viguiera porteri (A. Gray) Blake. Porter's golden-eye;  
Confederate daisy  
Gymnolomia porteri A. Gray

Technical Description

A taprooted annual.

Stems.--The main stem erect, to 8 dm tall but usually lower, simple or many and oppositely branched from below the middle, thus bushy and spreading, the main shoot slender but stiffish and brittle, terete below, somewhat ribbed toward the tip, yellow-green or tan, or tinted with maroon, somewhat harsh.

Leaves.--Numerous, alternate, the lowest gone by flowering time, those of mid-stem or mid-branch longest, spreading-ascending linear, or lance-linear, mostly 3-4 (-6) cm long, acute, revolute, sessile or nearly so, 1-veined, the upper surface harsh, dark green, the lower surface paler, harsh or even hirsute along the mid-rib; stem leaves grading gradually into narrower and shorter bracts of peduncles.

Inflorescence.--Peduncles slender, arching upward from upper bracteal leaves, themselves much longer than the heads and with few or no bracts. Heads ovoid-conic, 1.0-1.4 cm, high, the involucre hemisphaeric, 4-5 mm high, 7-10 mm broad across phyllary tips. Involucral bracts with outer series narrowly triangular, spreading, green, smooth or with a scattering of pale hairs on backs and edges and with inner series firmer, yellowish-tan, strongly many nerved, ascending, lance-ovate, acuminate, grading on the conic receptacle to narrower, thinnish, narrowly acute-tipped chaff, this greenish-brown with paler nerves.

Flowers.--Ray florets mostly 8-10, sterile, the corollas 1.0-1.5 cm long, oblong or elliptic-oblong, bright yellow, spreading. Disc flowers numerous, fertile, the corolla ca. 2.5 mm long, yellow with a short narrow tube flaring into a campanulate throat, the narrowly triangular lobes recurved.

Fruit.--Akene slightly flattened, about 2.5 mm long, in outline oblong or obovate, the apex broadly rounded or truncated, without a pappus, the surface dark gray-brown with darker blotches, toward the apex with several short, erect, pale hairs.

Distribution and Flowering Season

On and around granite outcrops in the Piedmont from Alexander County, North Carolina southwestward to Randolph and Chambers Counties, Alabama in Saint Clair and Shelby counties of Appalachian Alabama.

Special Identifying Features

This species, called "Confederate Daisy" is a northeastern representative of a largish genus of the southwestern U.S.A., Mexico and southward, thus has no near taxonomic relatives in the southeast.

Habitats and Management Implication

It was first known from the large granite outcrops, particularly Stone and Panola Mountains, of Georgia. In that the outcrops are local, so is the species, but

where it does occur it is an aspect dominant in fall, turning acres of granite to yellow gold. In that some of the outcrops are being converted to parks and nature conservacies, and in that it is weedy in such places, its future is bright. A plant of full sunlight and shallow soils it is forest related in the sense only that pines and low quality hardwoods ultimately occupy outcrops. Cutting of contiguous pines and erosion would probably increase this species whose major man-caused threat is the quarrying away of its granitic substrate.

#### References

- Blake, S. E. 1918. A revision of the genus Viguiera. Contribs. Gray Herb. Harvard 54: 1-205.
- McVaugh, R. 1943. Vegetation of the Granite Flatrocks of the Southeastern U. S. Ecol. Monograph 13: 120-166.
- Small, J. K. 1933. Manual of the southeastern flora, pp. 1421-1422. Chapel Hill, N.C.



SPECIES: #9 Viguiera porteri (A. Gray) ~~Blake~~. Confederate daisy

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut Over- story	Establish Plantation	Graze
Destroy							X	
Damage								X
No Lasting Effect	NA							
Beneficial if Done Properly					X	X		

Other Comments:

\*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Viguiera porteri (A. Gray) Blake



GLOSSARY

- Abaxial.--On the side of the appendage away from stem or axis.  
Acaulescent.--Lacking a stem (plants with peduncles arising from rosettes often appear to have stems, but are acaulescent).  
Actinomorphic.--Radially symmetrical, as in the graphic "star", starfish, snowflake, tube or cylinder; any longitudinal plane through the central axis produces similar halves.  
Acuminate.--Apex tapering concavely to a sharp point.  
Acute.--Apex with sides straight, forming an angle of 90° or less.  
Adaxial.--On the side of the appendage toward stem or axis.  
Adnate.--Part or parts of one cycle of a flower variously united to a part or parts of another cycle.  
Adventitious.--Growth of one organ from another in some other way than customary (i.e. new shoots directly from fire-scarred trunk of pond pine or pitch pine; 'prop' roots of mangrove, corn).  
Akene.--A single-seeded, dry, indehiscent fruit with pericarp usually thin, attached to seed at but one point but superficially appearing tight.  
Allopatric.--Species or subdivisions of species in a genus are allopatric if their geographic ranges do not overlap.  
Alternate.--Arrangement of parts on a common axis one per node.  
Amplexicaul.--Strongly clasping the axis.  
Anastomosing.--Veins, nerves or chains of cells converging or cross-joining to form a closed network.  
Androgynophore.--A common stalk supporting both male and female floral parts above the level of departure of perianth.  
Androphore.--Stalk as in above producing only stamens.  
Angiosperm.--Class of vascular plants in which ovules are borne within ovary wall; flowering plant.  
Annual.--A plant going from seed to seed in a single growing season, dying at the end.  
Anther.--Pollen-producing part of the stamen.  
Anther sac.--Pollen chamber.  
Anthesis.--The time of receiving and/or sending pollen.  
Antrorse.--Directed forward or upward on a surface.  
Apex.--Tip.  
Apical.--Referring to apex.  
Apiculate.--Apex ending abruptly in a short-pointed tip.  
Apomixis.--Mode of reproduction bypassing gametic fusion.  
Appressed.--Flattened against.  
Aquatic.--Living in water.  
Arachnoid.--A cobwebby pubescence is arachnoid.  
Aril.--An outgrowth of the hilum or the funiculus of a seed, or a fleshy, modified appendage of the sporophyll.  
Aristate.--Bristle-awned.  
Ascending.--Curved upward from the base.  
Attenuate.--Gradually and finely tapering (usually referring to plane base).



Auricle.--Ear-lobed-like, usually paired, appendages at base of a blade or bract, or at leaf sheath apex.  
 Awl-shaped.--Rigid, narrowly-triangular, tapering to a sharp point, as in leaves of many Juniperus.  
 AWN.--A rigid, bristle-like appendage (as in wheat, barley, etc.)  
 Axil.--The internal angle formed at junction of appendage and axis.  
 Axile.--At the axis, as in axile placentation.  
 Banner.--The upper petal of many leguminous plants.  
 Barbellate.--Finely barbed, as in the pappus of many composites.  
 Basal.--Position of appendages on an axis (i.e. basal rosette), or a placentation type in which one or more ovules are at the locule base.  
 Basifixed.--A basal attachment of an organ or organ part.  
 Bearded.--Bearing a tuft or beard of longish trichomes.  
 Berry.--A fleshy, indehiscent, two or more-seeded fruit.  
 Biennial.--A plant that completes its life cycle in two years, usually producing a rosette the first season, bolting from it the next.  
 Bifid.--Forking at apex.  
 Bilabiate.--Two-lipped, as in the corolla of many mints, snapdragons.  
 Bipinnate.--An arrangement in compound leaves where the main rachis has rachises pinnately arranged along it.  
 Bisexual.--Producing both sexes in one flower.  
 Blade.--The flattened "laminar" part of an appendage such as leaf, sepal, bract, petal, etc.  
 Bract.--A leaflike appendage within an inflorescence, subtending an inflorescence, or along a pedicel below the receptacle; usually smaller than the foliage leaf, sometimes modified to resemble perianth (as in Nyctaginaceae, Cornaceae, etc.)  
 Bracteole.--Diminutive of bract.  
 Bud.--An unexpanded shoot or flower.  
 Bulb.--An underground storage organ primarily made up of imbricate fleshy leaves (i.e. onion, tulip).  
 Bulblet.--Diminutive of bulb, often aerially formed (as in axils of lily leaves, onion inflorescences); bulbil.  
 Caducous.--Falling off early, as in sepals of bloodroot.  
 Caespitose.--Tufted.  
 Calciphilic.--Requiring calcareous substrate.  
 Callus.--A hard, local thickening; in grasses the hard, often hairy or pointed base of the floret.  
 Calyculus.--A cup formed by connation of one or more series of bracts or bractlets.  
 Calyx.--Outermost cycle or cycles of perianth, often the only perianth in many specialized flowers; a collective term for all sepals.  
 Cambium.--The lateral meristem in vascular plants.  
 Campanulate.--bell-shaped.  
 Cancellate.--A finely latticed surface.

- Canescent.--A grayish, short pubescence.
- Capitate.--Head-like.
- Capsule.--A dry, several to many-seeded fruit, usually the product of a compound of two or more carpels.
- Carpel.--A seed producing specialized leaf; a megasporophyll; one or more make up the female part of the flower.
- Caruncle.--An outgrowth from or around the hilum of a seed (i.e. outgrowth in castor bean).
- Caryopsis.--A dry, single-seeded, indehiscent fruit with a tight pericarp; the fruit of most grasses.
- Castaneous.--Chestnut brown.
- Catkin.--A lax, often elongate, many-flowered unisexual inflorescence of small, bracteate but otherwise naked flowers.
- Caudate.--Producing a tail-like appendage.
- Caudex.--A short vertical axis involving either rhizome apex or stem base.
- Caulescent.--Producing an above-ground stem.
- Cauline.--Pertaining to stem.
- Chaff.--Collective for thin, papery bracts, as in the heads of many sunflowers.
- Channeled.--Longitudinally grooved.
- Chasmogamous.--Flowers open, usually showy, mostly outcrossing.
- Ciliate.--Bearing a fringe of hairs marginally.
- Ciliolate.--Diminutive of ciliate.
- Circumscissile.--Dehiscence around the equator of fruit or anther.
- Clavate.--Club-shaped.
- Claw.--A petiole-like narrowing at base of sepal or petal blade.
- Cleistogamous.--Flowers remaining closed, usually selfing.
- Clone.--Vegetative replicates of a biotype.
- Collar.--Zone opposite the ligular zone in the leaf of grass-like plants.
- Column.--A welding of sterile portions of male flowers (Hibiscus) or of male and female parts of a flower (Orchidaceae).
- Compound.--A grouping of leaflets (compound leaf), carpels (compound ovary), or inflorescences (compound cyme, umbel, etc.)
- Connate.--Fusion of like parts in a floral cycle.
- Connective.--Sterile tissue connecting fertile parts of anther.
- Contorted.--A flat spiral clockwise or counterclockwise overlapping of parts of a floral cycle (usually petals) in the bud, as in Phlox.
- Convolute.--Synonym of above.
- Cordate.--In the shape of the Valentine "heart"; cordiform.
- Coriaceous.--Leathery in texture.
- Corm.--Underground storage organ, typically roundish or oblate, anatomically a compacted stem invested by thin scale leaves and producing daughter corms (cormels) apically (Gladiolus, many orchids, etc.)
- Cormophyte.--Ecological term for an herb with strong underground storage organs, such as would be common in droughty or savanna soils.
- Corolla.--Collective term for petals.

- Corona.--Tissue formed in development of petals and stamens in a floral tube to produce "webbing" between filaments; may be staminal solely (Hymenocallis) or staminal and corollal (Narcissus).
- Corymb.--A specialized raceme, determinate and convex, in which the symmetry is as wide as long or wider, the lowest flowers with the longest stalks.
- Costa.--A strong rib or midrib.
- Costate.--Strongly longitudinally ribbed.
- Cotyledon.--The first leaf (Monocotyledons) or leaves (Dicotyledons) to develop from the embryo.
- Crenate.--A scalloped leaf margin; diminutive is crenulate.
- Crown.--Inner, often coronal or corona-like outgrowth from perianth base or corolla throat.
- Culm.--The stem in grasses or grass-like plants.
- Cuneate.--An acute base.
- Cuspidate.--Apex tipped with a narrow, firm, sharp point.
- Cyme.--A broad, flat-topped or somewhat concave inflorescence with the central flower or flowers opening first.
- Cymule.--A cymose unit of a compound cyme.
- Cystolith.--Crystallized calcium deposits in cells, often visible in leaf epidermis as lens-shaped bodies (Acanthaceae, Urticaceae, etc.)
- Deciduous.--Seasonal shedding, usually by abscission, usually in reference to leaves.
- Decumbent.--Base of stem or shoot arching outward and downward, then erect.
- Decurrent.--Base of appendage running evidently downward from its point of attachment on axis.
- Decussate.--Arranged oppositely or whorled on axis so that members of alternate nodes are in vertical alignment (i.e. Juniperus, Cupressus, Rhexia, etc.)
- Dehiscence.--Splitting, as in valves of mature fruits, anthers, etc., usually along a suture.
- Deltoid.--"Delta" shaped.
- Dentate.--Toothing of a blade margin so that the teeth are spreading, roughly equal-sided.
- Denticulate.--Diminutive of dentate.
- Determinate.--With definite number; in inflorescences, a type in which the apical bud is first to open.
- Dichasium.--A basic cymose inflorescence; a simple dichasium is a symmetrical, triflorous, cyme; a compound dichasium is 3-branched, the central branch a pedicel, the laterals developing simple dichasia.
- Dicotyledon.--An angiosperm with two embryonic leaves.
- Didymous.--Two-paired, as in stamens of mints, etc.
- Didynamous.--Several stamens, two equal and shorter than the others.
- Dimorphic.--Two forms of the same part or organ.
- Dioecious.--Species having unisexual individuals.
- Disc.--An outgrowth of tissue from the receptacle around the base of an ovary and often between filament bases.



- Distichous.--Arrangement of leaves or parts into a single plane oppositely along a common axis.
- Dorsal.--Backside of an appendage.
- Dorsifixed.--Attachment of stamen filament to back of connective.
- Drupe.--A single-seeded, fleshy, "stone" fruit.
- Echinate.--A spiny, sharply tuberculate, or prickly surface.
- Elliptic.--With the outline an ellipse.
- Ellipsoidal.--A solid with an elliptic outline.
- Emarginate.--Shallowly notched at apex.
- Embryo.--Everything inside a seed except seed coat and endosperm.
- Endemic.--Confined in distribution to but one geographic area.
- Endocarp.--Innermost, often vascularized, sometimes stony, layer of ovary wall.
- Endosperm.--Triploid or polyploid nutritive product of double fertilization in angiosperms.
- Entire.--The untoothed or unappendaged, straight-line edge of a blade.
- Epidermis.--The outer tissue layer of the plant body.
- Epigynous.--Floral parts appearing to arise from ovary apex.
- Epipetalous.--Stamens appearing to arise from petals.
- Epiphyte.--Growing upon another plant.
- Equitant.--Arrangement of a distichous sort, in which each base fits into the base of the leaf or part directly beneath.
- Erect.--Orientation of axis plumb.
- Erose.--A finely irregular edge.
- Exocarp.--Outermost layer of ovary wall.
- Exserted.--Projecting beyond.
- Extrorse.--Anthers opening away from floral axis.
- Falcate.--Scimitar-shaped outline of blade.
- Fascicle.--Numerous parts clustered (needles in pines, stamens in Hypericum).
- Fertilization.--The process of fusion of egg and sperm.
- Filament.--The sterile, usually slender, tissue connecting the anther with the flower.
- Filiform.--Hair-like in slenderness.
- Fimbriate.--Close-set, narrow divisions of a margin, usually a strong fringe or tuft of long hairs.
- Flabellate.--Spreading fan-like.
- Floccose.--A woolly-matted covering.
- Flower.--A short reproductive shoot in angiosperms, with the axis forming a receptacle, with appendages modified from leaves, some reproductive (stamens, carpels), others (perianth) sterile, more leaflike or vestigial or absent.
- Follicle.--A dry dehiscent fruit, product of a single carpel, splitting purselike along one line (i.e. milkweed, dogbane).
- Free-central.--A placentation in which there are no cross-walls in the ovary, the placental zones running along a central axis, the columella, in a unilocular ovary.

Fruit.--A ripened ovary wall and contents, sometimes also ripened receptacle and other floral parts as well.  
 Funiculus.--The connector of an ovule, later seed, to the placenta.  
 Funnelform.--Funnel-shaped.  
 Fusiform.--Spindle-shaped, a narrow, bi-caudate, ellipsoid.  
 Gamopetalous.--Petals variously joined.  
 Gamosepalous.--Sepals variously joined.  
 Genuiculate.--Abruptly bent.  
 Glabrous.--Smooth-surfaced.  
 Gland.--Any organ or modified cell having a secretory function.  
 Glaucous.--With a "bloom", this usually a wax and usually a powdery whitening.  
 Globose.--A solid round.  
 Glomerule.--A small, tight cluster of flowers.  
 Glume.--A chaffy bract as in many grass-like plants.  
 Gymnosperm.--A seed-bearing vascular plant with ovules not covered by ovary wall (cycads, pines, etc.)  
 Gynobasic.--Term for styles that are continuous through the ovary to the receptacle center in such groups with lobed ovaries as borages, mints.  
 Gynoecium.--Collective for all female parts in a flower.  
 Gynophore.--A stalk subtending an ovary.  
 Habit.--A collective term for mode of perennation, overall form.  
 Hastate.--Used for plane outlines with basal lobes prominent, projecting strongly and narrowly at right angles, as in the guard of a sword hilt.  
 Haustorium.--In seed plants a specialized, tissue-boring, root produced by parasites (i.e. Cuscuta).  
 Head.--An inflorescence in which all flowers are sessile on a common receptacle.  
 Helicoid.--Coiled in one plane, as in inflorescences of borages.  
 Heliophyte.--An obligate sun plant.  
 Herb.--A non-woody plant, one that dies back to the rootstock or totally dies at the end of a season.  
 Hilum.--The attachment scar left on the seed with the seed detaches.  
 Hirsute.--A coarse, spreading, long pubescence, slightly less stiff than in hispid pubescence.  
 Hispid.--A stiffish, long, spreading pubescence of sharp hairs.  
 Hispidulous.--Diminutive of hispid, the surface thus scabrid.  
 Hydrophyte.--An aquatic plant.  
 Hypanthium.--That meld of perianth and receptacle that forms a cup, tube or disc from whose rim come perianth lobes and other floral appendages exclusive of carpels.  
 Hypogynous.--Floral parts attached to receptacle below the ovary.  
 Imbricate.--Overlapping as in shingles (i.e. bud scales, perianth parts in bud).  
 Incised.--Deeply and sharply irregularly cut margins of blades.



- Indehiscent.--Compound structure, usually a fruit, that at maturity does not split along sutures.
- Indusium.--Outgrowth from leaves of ferns that covers the sori.
- Inferior.--Below; term usually denoting a floral type in which free parts depart above the ovary.
- Inflorescence.--Any arrangement of flowers on a plant.
- Integument.--The outer layer or layers of an ovule, later seed.
- Internode.--The area of an axis between two nodes.
- Introrse.--With line of dehiscence toward the axis, as in anthers.
- Involucel.--A whorl of bractlets.
- Involucre.--System of bracts set numerously at base of inflorescence or subdivision of inflorescence.
- Involute.--Margin rolled inward.
- Irregular.--Denoting a lack of radial symmetry in a flower.
- Keel.--A dorsal-longitudinal ridge as in the keel of a boat.
- Keel petal.--One of two lower petals in a leguminous flower.
- Labellum.--Lip; the lower (or upper) specialized petal in orchids.
- Lacerate.--Irregularly jagged margin with divisions and sinuses sharp.
- Laciniate.--Margin jagged with consistently narrow lobes.
- Lanate.--A pubescence of long, wooly, jointed hairs.
- Lanceolate.--The outline of a lance-head.
- Lateral.--Arising from the side of an axis or part.
- Latex.--A usually white colloid secreted by tubular systems of plant cells called laticifers (i.e. milkweeds, dogbanes).
- Leaf.--A nodal outgrowth, usually photosynthetic, usually plane.
- Leaflet.--Any leaflike subdivision of a compound leaf.
- Legume.--A two-valved, usually dehiscent dry fruit, the product of a single carpel.
- Liana.--A vine.
- Ligulate.--Developing a ligule, a flat, strap-shaped structure.
- Ligule.--A scale-like or fringe-like outgrowth adaxially from the apex of a sheath (as in grass leaves) or at junction of a blade with a claw (as in petals of carnation).
- Limb.--The divided or undivided, usually spreading part of a gamosepalous calyx or gamopetalous corolla above the orifice.
- Linear.--An elongate narrow outline with width ranging from that of a heavy pencil line to a crayon line; a long narrow parallel-sided outline.
- Lip.--One of two major divisions of the limb of a gamosepalous calyx or gamopetalous corolla in bilabiate flowers.
- Lobe.--Any rounded-tipped strong division of a margin.
- Locule.--A chamber of an ovary, fruit, or anther.
- Loculicidal.--A mode of dehiscence where the suture lies over the locule.
- Margin.--The border or periphery of a plane appendage.
- Marginal placentation.--Placentae on the outer wall of the locule, not intruding.
- Membranaceous.--Thin in texture.
- Mericarp.--A single and often single-seeded subunit of a dry dehiscent fruit where each subunit is completely separable at maturity.



Mesocarp.--The middle, often vascularized, layer of ovary wall.  
 Mesophyte.--A plant of "middle" environment as to moisture requirement.  
 Midrib.--The central vein of a leaf, bract, petal, etc.  
 Monadelphous.--Filaments joined to form a tube.  
 Monocotyledon.--An angiosperm developing but one embryonic leaf.  
 Monoecious.--Denoting a condition in a species where both sexes of unisexual flowers are produced on the same plant.  
 Monotypic.--Term for family or genus with but one species.  
 Mucro.--A short, narrow protuberance at the apex.  
 Muriccate.--A surface roughened with small, hard, points.  
 Nectary.--A gland made up of one or more cells secreting sugary fluid.  
 Node.--Zone along an axis at which appendages form.  
 Numerous.--Used in reference to floral parts of a large number, at least over 10.  
 Nut.--A dry, indehiscent, single-seeded fruit with a bony wall.  
 Oblanceolate.--An inverted lanceolate outline.  
 Obovate.--An inverted ovate outline.  
 Obtuse.--A blunt apex.  
 Ocrea.--A sheathing, often tubular, often fringed stipule; the diminutive is "ocreaola".  
 Opposite.--Paired appendages at node.  
 Orbicular.--Round in outline.  
 Ovary.--That part of the gynoecium developing and enclosing the ovules.  
 Ovate.--Outline as in a hen's egg.  
 Ovoid.--Solid with an ovate outline.  
 Pale.--The chaffy bract on the receptacular surface of some composites.  
 Palmate.--Digital arrangement of lobes of simple leaves or leaflets in compound leaves.  
 Pandurate.--Shaped as in the fiddle body.  
 Panicle.--A compound inflorescence, longer than broad, made up of fascicles, cymes, racemes, etc. as subunits.  
 Papilionaceous.--The butterfly-like corolla of many leguminous plants, made up of a banner petal, two "wing" petals and two keel petals.  
 Pappus.--The specialized calyx in composites, this usually persisting atop the maturing fruit and made up of fine to coarse bristles, awns, scales, etc.  
 Parasite.--An organism deriving nourishment from another living organism (i.e. *Cuscuta*).  
 Parietal.--Placentation in which the placentae intrude into the locule.  
 Pectinate.--A pinnate arrangement of segments in which these are very fine.  
 Pedicel.--The stalk of a flower connecting it to the inflorescence.  
 Peduncle.--The stalk of an inflorescence or the stalk of a flower if that flower is single on a plant or on a branch.  
 Peltate.--A central or subcentral attachment of stalk to blade in leaves or in leaflike structures.

Perennial.--An herbaceous plant that lives for more than two years, dying back to the rootstock at the end of a growing season.  
 Perfect flower.--A flower having both sets of sexual parts.  
 Perfoliate.--A leaf blade base that completely surrounds the stem.  
 Perianth.--Collective term for floral envelope, both sepals and petals.  
 Pericarp.--The ovary wall in angiosperms.  
 Perigynium.--The modified bract covering the ovary, later fruit, in Carex and Cymophyllus.  
 Perigynous.--Parts arising at level around the ovary, usually their fused bases forming part of a disc or hypanthial rim.  
 Petal.--The inner, usually brightly colored, cycle or cycles of perianth, usually less vascularized than sepals.  
 Petiole.--The stalk of a leaf.  
 Petiolule.--The stalk of a leaflet.  
 Phyllary.--The involucral bract in composites.  
 Phyllode.--A leaf comprised only of petiole or rachis.  
 Pilose.--A soft, usually spreading, long pubescence.  
 Pinnate.--An arrangement of leaflets or leaf blade lobes in two rows on opposite sides of a rachis or midrib.  
 Pith.--The soft, mostly parenchymous, core of twig or stem.  
 Placenta.--That part of the inner ovary wall that develops ovules.  
 Plumose.--Producing fine, elongate hairs as does the pappus of some composites such as thistle.  
 Pollen.--The product of reduction-division of the pollen mother cell in spermatophytes, usually resulting in a tetrad of small spores, later male gametophytes.  
 Pollination.--The process of transfer of pollen from the anther to the stigma of a flower.  
 Pollinium.--An agglutinated mass of pollen (as in orchids, milk-weeds).  
 Primocane.--The first wood of a shrub from which the flowering shoots, or floricanes, arise.  
 Prismatic.--Angled-solid, with plane faces, as in a prism.  
 Procumbent.--Axis growing flat over surface, not rooting at nodes.  
 Proximal.--Axis end of an appendage.  
 Puberulent.--A short pubescence.  
 Pubescent.--Collective term for a hairy surface.  
 Punctate.--Shallowly pitted.  
 Pyxis.--Specialized capsule with circumsessile dehiscence.  
 Quadrate.--Four-angled.  
 Raceme.--An inflorescence longer than broad, with several pedicellate flowers, the pedicels subequal.  
 Rachilla.--Central, often jointed, axis of spikelets or florets in many grass-like plants.  
 Rachis.--Axis of compound leaf or compound inflorescence.  
 Receptacle.--The floral axis.  
 Recurved.--Apically curved or bent backward toward base.  
 Reflexed.--Sharply recurved.



Regular.--Radially symmetrical; actinomorphic.  
 Relict.--Endemic leftovers from past geologic times.  
 Reniform.--Kidney-shaped.  
 Retrorse.--Directed downward.  
 Retuse.--A shallowly notched, broadly rounded apex.  
 Rhizome.--An underground, often horizontally oriented, stem.  
 Rhombic.--With the outline of a rhombus.  
 Root.--Mostly underground organ with functions of support, anchorage, absorption, storage.  
 Rosette.--Arrangement of leaves when spreading from a basal, tightly spiralled attachment (i.e. dandelion).  
 Rostrate.--Beaked.  
 Rotate.--Radially symmetrical calyx or corolla with lobes longer than tube.  
 Rugose.--A wrinkled surface.  
 Runner.--A slender stolon.  
 Sagittate.--The shape of an arrowhead, with basal lobes directed outward and downward, acute.  
 Salverform.--Trumpet-shaped, as in the corolla of Phlox.  
 Samara.--A dry, indehiscent, winged fruit.  
 Saprophyte.--A plant without chlorophyll, feeding on dead plant or animal matter.  
 Scabrous.--A roughened, sandpapery, surface.  
 Scale.--Usually a modified leaf that is small and chaffy (i.e. bud scales, bracts in grasses and sedges).  
 Scape.--An elongate, leafless peduncle or flower stalk, often developing from a rosette (i.e. bladderworts, butterworts).  
 Scarious.--Thin, as in translucent fine paper.  
 Sciophyte.--An obligate shade plant.  
 Schizocarp.--A dry fruit splitting at maturity to one-seeded mericarps.  
 Scorpioid raceme.--A unilaterally coiled, usually zig-zag raceme.  
 Secund.--Unilateral arrangement of parts along an axis.  
 Seed.--A fertilized, ripened ovule.  
 Sepal.--The outer, usually most leaf-like, perianth; usually green, but sometimes colored as in petals.  
 Septate.--Cross-partitioned.  
 Septicidal.--Dehiscence so that carpel walls separate at the cross walls of the fruit.  
 Serrate.--A toothed margin in which teeth are directed upward, the lower side of a tooth longest.  
 Serrulate.--Diminutive of serrate.  
 Sessile.--Lacking a stalk, thus attached directly.  
 Sheath.--The tubular, stem-sleeving base of a leaf, bract, or perianth member.  
 Shoot.--An aerial stem or branch; a new branch or twig of a woody plant.  
 Shrub.--A woody plant, usually with numerous shoots from the groundline with diameter under four inches and lower than 15 feet.



Silicle.--A short, bicarpellate fruit whose septum persists after the valves have fallen (many mustards).  
 Silique.--An elongate version of a silicle.  
 Simple.--Referring to simple-bladed leaves; not compound.  
 Sinuate.--A margin that is wavy, as in the sine curve.  
 Sinus.--The interval between two adjacent lobes of a margin.  
 Soboliferous.--Producing numerous shoots from an underground base.  
 Solitary.--In reference to flowers, one that appears singly.  
 Sorus.--Sporangial cluster in ferns.  
 Spadix.--A fleshy spike, the flowers often sunken or basally embedded in the fleshy axis.  
 Spathe.--A single bract or fused bract compound that sheathes an inflorescence or inflorescence base.  
 Spatulate.--Blade outline in which the rounded apex tapers concavely to an elongate narrow base (as in the old-fashioned spatula.)  
 Spike.--A variously elongated inflorescence of sessile flowers.  
 Spikelet.--A small chaffy or papery-bracted inflorescence as in grasses or sedges; may be actually modified racemes or other sorts of inflorescence).  
 Spine.--A rigid, sharp outgrowth, modified from a leaf, leaf tip, leaf margin, stipule, etc., but essentially foliar; not to be confused with thorns which are modified shoots.  
 Spreading.--Appendages departing nearly at right angles.  
 Spinulose.--Short spines along margin.  
 Sporangium.--Spore case.  
 Spur.--The hornlike projection from base of anther (i.e. ericads), perianth (bladderworts, columbines, larkspurs).  
 Squarrose.--The margin toward apex of bract, leaf or other appendage abruptly spreading or recurved.  
 Stamen.--A single male unit of a flower, composed of filament, connective, anther.  
 Staminode.--A reduced, non-pollen-producing stamen.  
 Stellate--Star like.  
 Stem.--A leaf producing axis in vascular plants, usually producing leaves and buds at each node.  
 Stigma.--A variously dilated, branched, lobed, pollen-receptive zone of the gynoecium, usually at stylar apex.  
 Stipe.--A stalk.  
 Stipitate.--Stalked.  
 Stipule.--A leaflike appendage, spine or gland lateral to leaf base on some stems; may be persistent or deciduous.  
 Stolon.--A modified slender stem, the internodes long and arching, the nodes rooting.  
 Stomata--Epidermal pores through which gas exchange occurs.  
 Strigillose.--Stiff, short, subappressed pubescence.  
 Strigose.--Stiff, comparatively longer, subappressed pubescence.  
 Strumose.--Swollen-based, as in some stiffish hairs.  
 Style.--The narrowed sterile apex of an ovary, terminating in stigma tissue.

Stylopodium.--A disc-like tissue around the styler bases in many Apiaceae.  
 Succulent.--Fleshy, usually swollen with water.  
 Superior ovary.--Free base of ovary at or above level of other floral parts (hypogyny).  
 Suture.--Zone of union of carpels, usually marked by a ridge or groove; line of dehiscence.  
 Sympatric.--Overlapping geographic range of allied taxa in a genus.  
 Taproot.--A strong and dominant, usually plumb, primary root.  
 Tepal.--A perianth part superficially identical to all other perianth in a given flower.  
 Terete.--Round in cross-section.  
 Terminal.--An apical position in reference to shoot.  
 Ternate.--A three-palmate system of branching of compound leaves or inflorescences.  
 Throat.--Zone where limb and tube of calyx or corolla come together; orificial area.  
 Tomentose.--A surface densely covered by a mat of hairs, thus obscured, is tomentose.  
 Tomentulose.--Having a fine tomentum.  
 Tree.--A woody plant, usually with distinct growth rings of wood, with one or few strong trunks having diameters of four inches or more and heights of 15 feet or more at maturity.  
 Triangular.--Three-angled in cross-section; trigonous.  
 Trichome.--Any plant hair.  
 Trifoliolate.--With three leaflets.  
 Tube.--Joined tubular bases of sepals and/or petals; hollow cylinder.  
 Tuber.--A contracted, swollen, food-storage branch, with numerous, often irregularly arranged buds or "eyes"; usually underground, rarely aerial (Dioscorea).  
 Tuberculate.--Surface beset with numerous small, narrow bumps (tubercles).  
 Tubular.--A hollow cylinder.  
 Umbel.--An inflorescence in which the pedicels or primary branches arise at a common level at peduncle or branch apex.  
 Undulate.--A wavy margin or surface.  
 Unifoliolate.--A compound leaf with but one leaflet.  
 Unisexual.--Of one sex only.  
 Urecolate.--Urn shaped.  
 Utricle.--A dry single-seeded fruit with a thin, bladdery pericarp.  
 Valvate.--In buds, when edges of scales meet but do not overlap.  
 Valve.--A unit of wall of a dehiscent fruit; a flap of anther wall tissue.  
 Velum.--The indusium in Isoetes.  
 Ventral.--The inner face of an organ or appendage relative to axis.

Verticil.--A whorl.

Verticillate.--A whorled arrangement.

Villous.--A covering of long, soft, straight hairs; a dense pilosity.

Weed.--A pioneer plant quick to occupy bare areas or disturbed soils, a poor competitor but with high reproductive potential; a plant out of place; a species known to be part of lower seral stages and which invades area intended by man to produce other species of known value.

Zygomorphic.--A floral form that has but one ideal plane of division.

SEPTEMBER 1981



Figure 1. Blade outlines or forms.

- |                 |                             |
|-----------------|-----------------------------|
| a. filiform     | k. rhombic                  |
| b. linear       | l. ovate                    |
| c. subulate     | m. obovate                  |
| d. acicular     | n. runcinate                |
| e. lorate       | o. pandurate                |
| f. spatulate    | p. deltoid (triangular)     |
| g. lanceolate   | q. obdeltoid (obtriangular) |
| h. oblanceolate | r. orbicular                |
| i. oblong       | s. orbicular                |
| j. elliptic     | t. reniform                 |

Figure 2. Blade margins.

- |                       |                                |
|-----------------------|--------------------------------|
| a. entire             | m. pinnatifid (pinnate)        |
| b. undulate           | n. incised                     |
| c. sinuate            | o. dentate                     |
| d. crenate            | p. palmately lobed             |
| e. crenulate          | q. crispate                    |
| f. ciliate            | r. pedately lobed              |
| g. ciliolate          | s. pectinate                   |
| h. serrate            | t. fimbriate                   |
| i. serrulate          | u. deeply lacerate (laciniate) |
| j. doubly-serrate     | v. revolute                    |
| k. spinose (aculeate) | w. involute                    |
| l. denticulate        |                                |

Figure 3. Blade apices.

- a. acute
- b. aristate (awned)
- c. acuminate
- d. caudate
- e. cuspidate
- f. obcordate
- g. retuse
- h. emarginate
- i. mucronate
- j. mucronulate
- k. cirrhous
- l. apiculate

Figure 4. Blade bases.

- a. acute
- b. attenuate
- c. oblique
- d. truncate
- e. cordate
- f. peltate
- g. auriculate
- h. hastate
- i. sagittate
- j. perfoliate
- k. connate-perfoliate

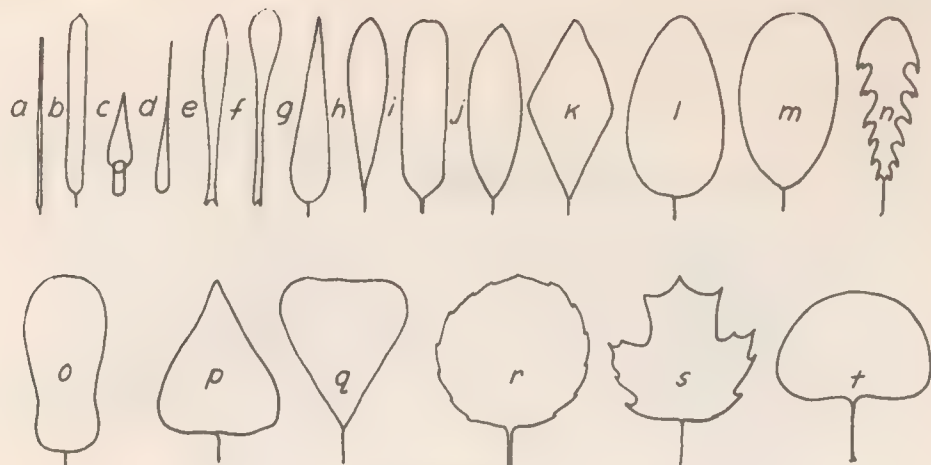


Figure 1.



Figure 2.



Figure 3.

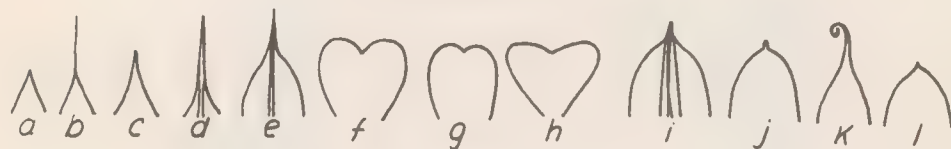


Figure 4.

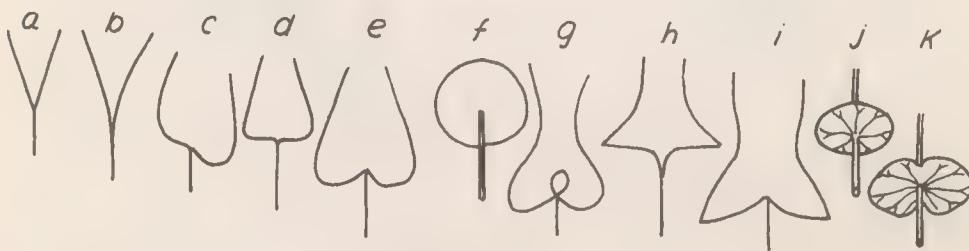


Figure 5. Inflorescence types; corolla types.

- a. spike (indeterminate)
- b. raceme
- c. panicle
- d. corymb
- e. cyme
- f. spadix (subtended by spathe)
- g. catkin (ament)
- h. simple umbel
- i. compound umbel
- j. head (capitulum)
- k. scorpioid
- l. campanulate
- m. funnelform
- n. urceolate
- o. bilabiate (zygomorphic)
- p. salverform
- q. tubular
- r. rotate
- s. ligulate
- t. papilionaceous





Figure 5.

# INDEX

<u>Agalinis</u> .....	1025	<u>Fothergilla</u> .....	586
<u>Agrimonia</u> .....	590	<u>Gentiana</u> .....	885
<u>Amphianthus</u> .....	1030	<u>Geum</u> .....	595
<u>Andropogon</u> .....	40	<u>Glyceria</u> .....	66
<u>Apios</u> .....	617	<u>Harperocallis</u> .....	191
<u>Aquilegia</u> .....	393	<u>Hartwrightia</u> .....	1151
<u>Arabis</u> .....	471	<u>Hedeoma</u> .....	978
<u>Arenaria</u> .....	359	<u>Hedyotis</u> .....	1078
<u>Asclepias</u> .....	889	<u>Helianthus</u> .....	1155
<u>Asimina</u> .....	448	<u>Heterotheca</u> .....	1179
<u>Aster</u> .....	1090	<u>Heuchera</u> .....	569
<u>Astragalus</u> .....	621	<u>Hexastylis</u> .....	308
<u>Aureolaria</u> .....	1035	<u>Houstonia</u> .....	1074
<u>Balduina</u> .....	1107	<u>Hudsonia</u> .....	758
<u>Baptisia</u> .....	625	<u>Hymenocallis</u> .....	237
<u>Betula</u> .....	280	<u>Hymenophyllum</u> .....	8
<u>Brickellia</u> .....	1111	<u>Hypericum</u> .....	745
<u>Cacalia</u> .....	1115	<u>Ilex</u> .....	719
<u>Calamintha</u> .....	937	<u>Iliamna</u> .....	741
<u>Calamovilfa</u> .....	48	<u>Illicium</u> .....	444
<u>Callirhoe</u> .....	736	<u>Isoetes</u> .....	1
<u>Carex</u> .....	91	<u>Jamesianthus</u> .....	1187
<u>Castanea</u> .....	285	<u>Juncus</u> .....	179
<u>Chionanthus</u> .....	873	<u>Justicia</u> .....	1057
<u>Cimicifuga</u> .....	397	<u>Lachnocaulon</u> .....	175
<u>Clematis</u> .....	401	<u>Leavenworthia</u> .....	480
<u>Clitoria</u> .....	646	<u>Lechea</u> .....	762
<u>Conradina</u> .....	945	<u>Lesquerella</u> .....	508
<u>Coreopsis</u> .....	1123	<u>Liatris</u> .....	1191
<u>Croomia</u> .....	233	<u>Lilium</u> .....	195
<u>Croton</u> .....	693	<u>Lindera</u> .....	459
<u>Ctenium</u> .....	56	<u>Linum</u> .....	681
<u>Cuphea</u> .....	779	<u>Litsea</u> .....	463
<u>Cuscuta</u> .....	907	<u>Lobelia</u> .....	1086
<u>Cymophyllus</u> .....	121	<u>Lupinus</u> .....	651
<u>Cyperus</u> .....	125	<u>Lysimachia</u> .....	869
<u>Deeringothamnus</u> .....	452	<u>Lythrum</u> .....	783
<u>Delphinium</u> .....	417	<u>Macbridea</u> .....	982
<u>Dicerandra</u> .....	962	<u>Magnolia</u> .....	436
<u>Dionaea</u> .....	545	<u>Manisuris</u> .....	70
<u>Draba</u> .....	476	<u>Marshallia</u> .....	1203
<u>Echinacea</u> .....	1135	<u>Matelea</u> .....	892
<u>Elliottia</u> .....	829	<u>Monarda</u> .....	986
<u>Eriocaulon</u> .....	171	<u>Nemastylis</u> .....	245
<u>Eriogonum</u> .....	326	<u>Nestronia</u> .....	304
<u>Eryngium</u> .....	807	<u>Neviusia</u> .....	604
<u>Eupatorium</u> .....	1143	<u>Nolina</u> .....	203
<u>Euphorbia</u> .....	701	<u>Nuphar</u> .....	389

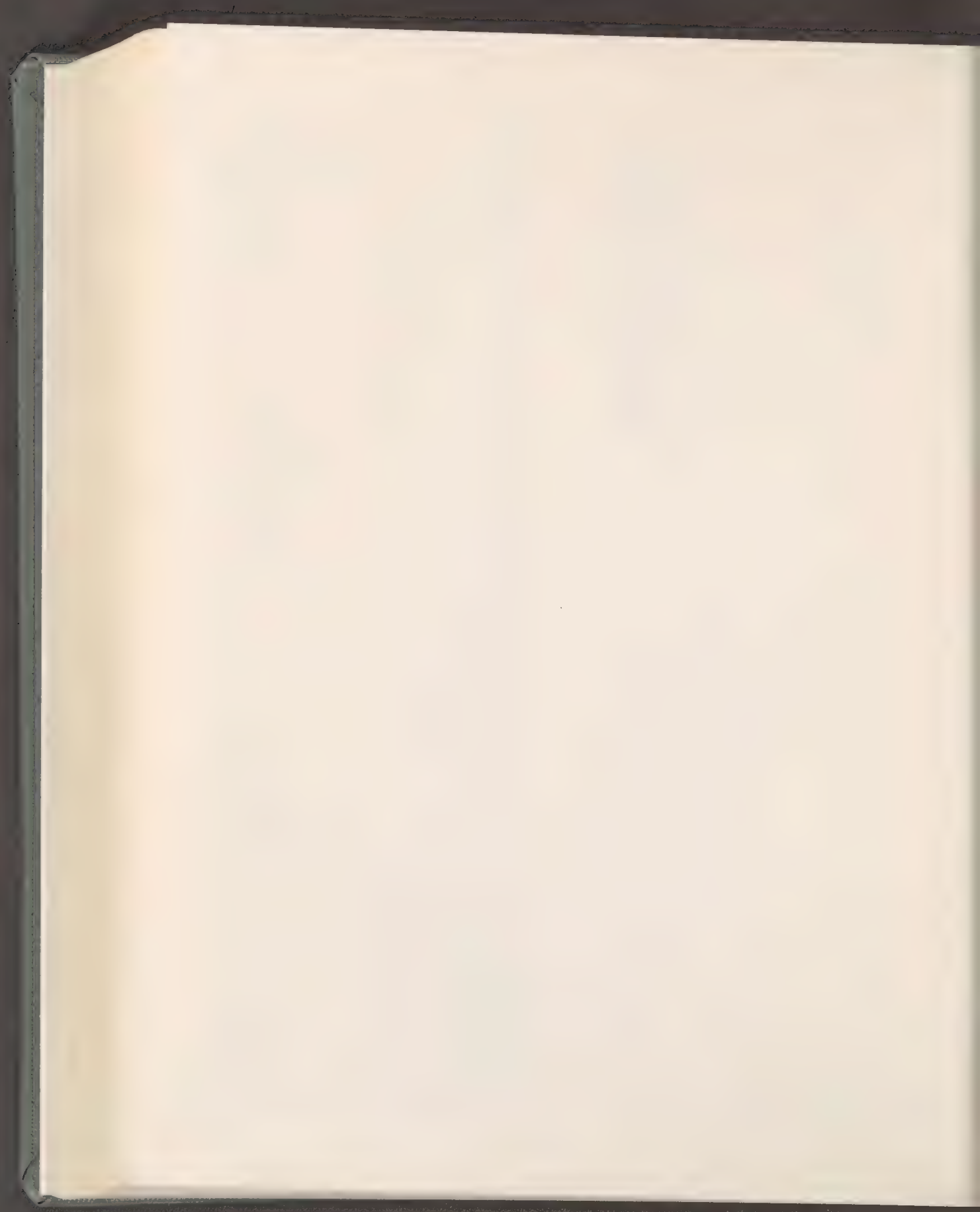
28

<u>Oenothera</u> .....	799
<u>Onosmodium</u> .....	924
<u>Ophioglossum</u> .....	4
<u>Oxypolis</u> .....	811
<u>Panicum</u> .....	75
<u>Paronychia</u> .....	381
<u>Paxistima</u> .....	727
<u>Penstemon</u> .....	1040
<u>Persea</u> .....	467
<u>Petalostemon</u> .....	655
<u>Phacelia</u> .....	920
<u>Phlox</u> .....	911
<u>Phyllanthus</u> .....	715
<u>Phyllitis</u> .....	16
<u>Physostegia</u> .....	990
<u>Pinguicula</u> .....	1049
<u>Plantago</u> .....	1070
<u>Platanthera</u> .....	253
<u>Polygonella</u> .....	330
<u>Polymnia</u> .....	1211
<u>Portulaca</u> .....	342
<u>Prenanthes</u> .....	1216
<u>Prunus</u> .....	608
<u>Psoralea</u> .....	664
<u>Ptilimnium</u> .....	820
<u>Pycnanthemum</u> .....	998
<u>Pyxidanthera</u> .....	859
<u>Quercus</u> .....	289
<u>Rhexia</u> .....	791
<u>Rhododendron</u> .....	837
<u>Rhynchosia</u> .....	669
<u>Rhynchospora</u> .....	133
<u>Ribes</u> .....	574
<u>Rudbeckia</u> .....	1220
<u>Sageretia</u> .....	731
<u>Sagittaria</u> .....	32
<u>Salix</u> .....	276
<u>Sarracenia</u> .....	549
<u>Saxifraga</u> .....	578
<u>Schizandra</u> .....	440
<u>Schoenolirion</u> .....	210
<u>Schwalbea</u> .....	1045
<u>Scutellaria</u> .....	1006
<u>Sedum</u> .....	561
<u>Senecio</u> .....	1236
<u>Shortia</u> .....	864
<u>Silene</u> .....	385
<u>Silphium</u> .....	1240
<u>Sium</u> .....	825
<u>Solanum</u> .....	1021
<u>Solidago</u> .....	1252
<u>Sphenostigma</u> .....	249
<u>Spigelia</u> .....	877
<u>Sporobolus</u> .....	87
<u>Stachys</u> .....	1016
<u>Streptanthus</u> .....	528
<u>Synandra</u> .....	1019

<u>Talinum</u> .....	346
<u>Taxus</u> .....	24
<u>Thalictrum</u> .....	428
<u>Thelypteris</u> .....	12
<u>Torreya</u> .....	28
<u>Trillium</u> .....	214
<u>Veratrum</u> .....	229
<u>Verbena</u> .....	929
<u>Verbesina</u> .....	1273
<u>Vernonia</u> .....	1279
<u>Vicia</u> .....	677
<u>Viguiera</u> .....	1283
<u>Viola</u> .....	774
<u>Waldsteinia</u> .....	612
<u>Warea</u> .....	533
<u>Xyris</u> .....	150
<u>Zamia</u> .....	20
<u>Zephyranthes</u> .....	241

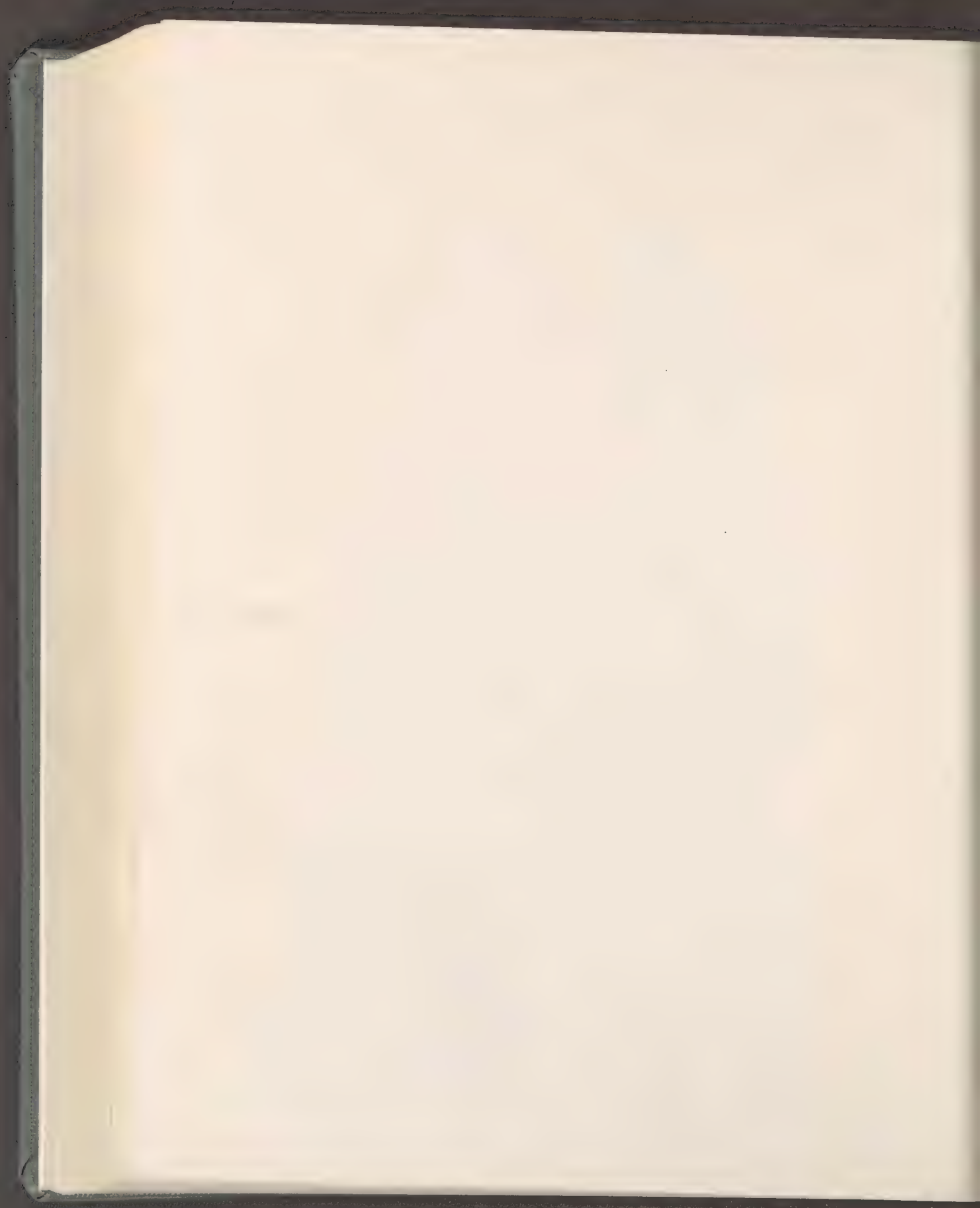














81256  
614











